Comment Responsiveness Summary
Proposed Revisions to 18 AAC 75
For comments received during two public comment periods
September 6, 2016

Introduction

In August 2015 the Alaska Department of Environmental Conservation (DEC) proposed revisions to 18 AAC 75 updating compound-specific cleanup levels in soil and groundwater and procedures for how they are calculated at contaminated sites. In addition, two documents adopted by reference were also updated to conform to the changes. The revisions were released for a 90-day public comment period on August 26, 2015. The end of the comment period was extended from November 26, 2015 to December 11, 2015 to correct a technical error in the amendments and allow the public additional time to comment. Comments submitted were compiled in a Comment Responsiveness Summary. On January 28, 2016 the Division also discussed the proposed changes with the Alaska State Legislature's Joint Administrative Regulations Review Committee. On May 19, 2016 a second public comment period was opened to allow the public to review revisions made to the proposed amendments based on public comments and to review the responsiveness summary. The end of the second public comment period was extended from June 23, 2016 to July 8, 2016 based on a request by a member of the public for additional time to provide comments.

Public Participation

During the two public comment periods, the department held four public workshops- two in Anchorage, one in Fairbanks, and one by teleconference. In addition, the department received and responded to 50 questions in writing during the public comment periods and posted these with other frequently asked questions on the Contaminated Sites Program's regulations web page. In response to requests, the department posted additional resources, tools and support documents during the comment period to facilitate the public's review and comment on the proposed amendments.

Combined Summary

This responsiveness summary consolidates the responses received during the two public comment periods, with responses received during the second public comment period appended to the earlier round following page 35. Comments received during the second round that were duplicates of those submitted in the first round are not included again because the department responded to those comments in the first round. Each summary groups similar comments into the categories listed and summarizes or shortens some of the comments to their key points. The last column indicates whether changes were made based each comment.

First Public Comment Period
Comments and Responses
May 17, 2016
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No.	Comment	ADEC Response	Changes Made? (Y/N)
18 AAC 75.340 Soil Cleanup Levels; General Requirements			
1.	"The department will require groundwater, surface water, soil, or sediment monitoring to estimate contaminant flux rates and to address potential bioaccumulation of each hazardous substance at the site," While general monitoring requirements and determination of contaminant flux rates are generally straightforward the reference to "addressing potential bioaccumulation " is vague as to what is actually being required. Clarify what is required to "address" potential bioaccumulation.	This subsection has not been changed from the existing regulations. The biological sequestering of a substance at a higher concentration than that at which it occurs in the surrounding environment or medium is not captured with the flux information for addressing bioaccumulation. Predicting the higher concentration associated with the organism is necessary to ensuring receptors are protected through the food web. To evaluate bioaccumulation, the department may require a literature review, modeled concentrations or seek that actual tissue data be obtained.	**N**
2.	The revision of 18 AAC 75.340(d) is unclear and/or does not seem to preserve the original intent of this section.	The department respects that commenters find the revision unclear. To improve clarity, the section will be revised as follows: **The cleanup level that applies at a site is the most stringent of either the site-specific calculated level or, for a pathway where no site-specific value was calculated, the listed value for a hazardous substance in Table B1 of 18 AAC 75.341(c) or Table B2 of 18 AAC 75.341(d).** The meaning of the language is that the cleanup level that applies is the **most stringent** of the following: The site specific level, if it was calculated, for human health, or the site-specific value, if it was calculated, for the migration to groundwater, or the listed value in Table B1 for either the human health or migration to groundwater pathway value, for which no site specific value was calculated. For example, a site-specific value for migration to groundwater cannot apply if it exceeds the listed value for human health. The same is true for site-specific levels for compounds in Table B2.	**Y**
3.	The proposed regulations have eliminated the use of an approved fate and transport model for Table B1 compounds.	The unintended omission of Table B1 was a technical error in the formal amendment document issued in the August 26, 2015 public notice. It was corrected as noticed in the October 22, 2015 supplemental public notice, to read: "(2) the levels for the migration to groundwater pathway in Table B1 or Table B2, based on approved site-specific soil and groundwater data, an approved fate and transport model...."	**Y**

4.	The new soil cleanup levels use a single number ("human health") encompass multiple exposure routes (ingestion, inhalation and dermal contact). Some sites do not have all pathways complete, so would the department consider a site-specific cleanup level that eliminates pathways that are not complete?	If one or more of these exposure routes is not present at a site, a responsible party may propose a site-specific cleanup level under Method 3 by running the calculations with default parameters and reviewing the individual criteria for each pathway and providing a thorough justification for eliminating one or more pathways.	**N**
5.	The revision of 18 AAC 75.340(a) is unclear or does not preserve the original intent of this section.	The department will revise the text to clarify the intent, as follows: For each site... a responsible person shall propose soil cleanup levels for approval, shall base those cleanup levels upon an estimate of the reasonable maximum exposure expected to occur through one or more pathways that include the Table B1 human health or migration to groundwater pathways, and the Table B2 ingestion, inhalation, or migration to groundwater pathways under current and future site conditions...	**Y**
6.	ADEC needs to define the term 'sensitive subpopulations' more clearly in the regulation (18 AAC 75.990).Will subsistence hunters on the North Slope be considered in the definition of a sensitive subpopulation? What is meant by a 'site specific analysis?' This should be well defined in the revised 18 AAC 75.990 and clearly laid out in the Risk Assessment Procedures Manual (RAPM).	Infants, young children, pregnant women, and the elderly are common examples of sensitive subpopulations. When these subpopulations are exposed to contamination, additional assessment may be required to ensure the default cleanup levels are protective. It is correct that some RfDs do take sensitive subpopulations into consideration, but this is not the case for every compound. In addition, increased exposure may also occur which is not captured in the default exposure scenarios used to generate the default cleanup levels. As the scientific knowledge about the determinants of susceptibility expands, our ability to identify vulnerable subpopulations will improve. Due to unforeseeable variables, having to do with availability of toxicity information, the number of individuals affected, the duration, and the specific nature of their sensitivity (pregnancy, elderly, type of illness or other vulnerability), setting specific criteria would inevitably fail to anticipate all of these variables. The department must retain discretion to effectively apply this regulation on a case by case basis. Peer-reviewed data documenting how sensitive subpopulations are impacted by a chemical at a certain concentration would be required to develop a cleanup level (under Method 4) that is protective of said sensitive subpopulation. Any more prescriptive language to set specific criteria would inevitably fail to anticipate all of the variables that could be associated with the exposure and advancement in science and could ultimately have the effect of being overly burdensome on the regulated community. The department must retain discretion to effectively apply this regulation on a case by case basis. Subsistence hunters on the North Slope would have an increased intake rate of the contamination of potential concern that would be captured in the additional exposure pathways due to their lifestyle as noted in the RAPM and 18 AAC 75.340 (i) (D) but not the default cleanup values presented in the tables.	**N**

Cleanup Levels – Detection Limits			
7.	Please find attached a spreadsheet detailing Test America's evaluation of the new 2016 limits. We have only listed compounds where we don't meet the new limits. In columns N, O, P we have classified how these limits might be met (definitions for "A, B & C" categories at the bottom of the table). Additional comments are in column Q and at the bottom of the table. We identified in column M if our LOD meets the limits (for DoD work in AK). If not, we identified in column Q if our MDL meets the limit (for commercial AK work).	The department thanks the commenter for providing this information as it improves our understanding of the capabilities of the laboratories.	**N**
8.	ADEC's stated intent is to make derivation of regulatory cleanup levels consistent for all compounds and applicable to human health risk levels. However, this approach leads to a number of cleanup levels that are not achievable given the currently available analytical technology. We recommend revising the approach to consider the currently available analytical technology. Different laboratories have different reporting limits and different analytical techniques, making data comparison of nondetects within a given site with data from different laboratories (a common practice) difficult at best. Rather, the ADEC should determine a feasible detection limit that all approved labs under the CS program are able to reach. In cases where that detection limit is greater than the cleanup limit, ADEC would then be able to develop a programmatic approach, making cleanup decisions that are much more legally defensible.	Where a reporting limit below the cleanup level cannot be achieved by any of DEC's approved labs, the RP may propose to set the cleanup level at the Practical Quantitation Limit (PQL) if the PQL is no greater than 10 times the MDL or no greater than PQL listed in methods set by SW-846, if available. In the absence of a method SW-846 PQL, DEC may determine the cleanup level has been met if the PQL is no greater than 10 times the MDL. DEC may also require one or more of the following: • The comparison of the Limit of Detection (LOD) to the cleanup level • The use of a surrogate compound to estimate the concentration • The use of a specialized method or procedure to reduce PQL's • Monitoring of the compound to ensure levels do not exceed PQL's over time It is important to recognize that laboratory analytical technology is an evolving field, with improvements in analytical detection continually occurring; therefore defaulting to the PQLs as the cleanup levels in the tables would not represent the state of the best available technology in laboratory analysis. If a consultant or RP has questions about a lab's ability to provide reporting limits below cleanup levels and thus, meet data quality objectives, they are invited to contact DEC technical staff for assistance.	**N**
9.	Several contaminants do not have available reference methods or are not defined. Antimony (metallic) Soil and Water Free Cyanide Soil Formaldehyde Soil and Water Hydrazine Mercury (elemental)	If a reference method is not available, the responsible party may propose an analytical method as part of the Sampling and Analysis Plan. The project manager and program chemist will review the reference method and lab standard operating procedure. The Department can then approve the Sampling and Analysis Plan.	**N**

	Analytical procedures generally yield total metals and cannot differentiate between metallic, elemental or other oxidation states. ADEC should reference valid methods for metallic antimony, elemental mercury, Hydrazine in soil and water, Formaldehyde in soil and water, and free cyanide in soil that can achieve reporting limits below the MCLs.		
10.	It is likely that most laboratories can achieve PQLs no greater than those established in EPA's SW-846 guidance. However, ADEC may determine that additional action is necessary to ensure projection of human health, safety or welfare of the environment. Of the four options listed, the most viable would be special collection or analytical procedures. What oversight is proposed to assure equitable application of approved PQLs for all responsible parties and ensure the "improved or modified" methods are based on sound, reproducible science and adequate peer review?	The Alaska Lab Approval Program approves the commonly used laboratory methods. For modified procedures the lab method is reviewed and approved by the Department before samples can be analyzed. The program chemist (often in consultation with EPA) reviews each "improved or modified" method and the lab's standard operating procedure to ensure that the method and procedure are based on sound, reproducible science.	**N**
11.	One accepted technique for lowering reporting limits for organic compounds by GC/MS is the use of selected ion monitoring, SIM. This technique involves the practice of monitoring and recording ion currents at one or more selected ion m/z values rather than recording the full mass spectra. Because the detector is integrating the signal for a longer time at the relevant ion, limits of detection can be lowered, but at the cost of increased susceptibility of the analysis to unexpected interference. EPA reference method 8270D Section 11.5.5 cautions: "The use of selected ion monitoring (SIM) technique is acceptable for applications requiring quantitation limits below the normal range of electron mass spectrometry. However, SIM may provide a lesser degree of confidence in the compound identification, since less mass spectral information is available. Although SIM analysis can lower reporting limits by 10X to 100X, petroleum contamination or naturally occurring biogenics can contribute to more false positives by the use of this technique.	Noted.	**N**
12.	Many of these cleanup levels are below what can be detected by commercial laboratories. How can ADEC expect us to demonstrate a site meets cleanup level requirements?	According to 18 AAC 75.355(c)(1), in cases where the practical quantitation limit (PQL) is greater than the cleanup level, the Department will determine a responsible party to have attained the cleanup level if the PQL is no greater than ten times the method detection limit (MDL) and the PQL is no greater than the PQL established in EPA's Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW-846). In cases where a contaminant is not listed	**N**

		in SW-846, the responsible party must demonstrate that their DEC approved lab does not have a PQL that can meet the cleanup level. Procedurally, when the RP submits a Sampling and Analysis Plan, they should: • State that the cleanup level for a particular analyte can't be met with current technology • Cite the PQL listed in SW-846 • Ask the Department to approve an alternative cleanup level at that PQL By approving the Sampling and Analysis Plan, the Department will also be approving the alternative cleanup level.	
13.	At present, ADEC only supports the use of the medium level, methanol preserved method for VOCs in soil. The low level method with sodium bisulfate solution or freezing preservation is only allowed on a case by case basis. To even approach achieving the reporting limits required for some compounds the low level method must be allowed. This would require both low level and medium level samples to be collected and may necessitate both to be analyzed. It should be noted that 1,2,3- trichloropropane is not an analyte listed for SW-846 method 8011 and the water MCL of 0.0075 ug/l is below the pql of this method for analytes included. Of greater significance is that this method is clearly for water only and EPA Region 10 laboratory experts are very skeptical of adapting the method for soils.	As the commenter states, low level analysis is allowed on a site-by-site basis. Preservation with sodium bisulfate causes some compounds to degrade, so methanol preservation is also required. The Department is in the process of updating its Technical Memorandum regarding low-level VOC analysis to include additional preservation techniques as well as to clarify when methanol preserved sampling can be discontinued. The modified method 8011 for 1,2,3-TCP is not ideal, but is the best method available and is routinely used by both ADEC and EPA. ADEC will develop guidance on this and other methods in a technical memo.	**N**
Cleanup Levels - General			
14.	ADEC is proposing that when the proposed risk-based cleanup levels are too low to be analytically achievable, that the project cleanup levels will be determined by the ADEC PM on a site-specific basis. This would not constitute a consistent application of cleanup levels. If cleanup levels are not applied consistently, they do not meet the requirements to be considered ARARs. Under 40 CFR § 300.400(g)(4) only state standards that meet the following requirements can be potential ARARs: 1) promulgated; 2) identified by the state in a timely manner; and 3) are more stringent than federal requirements.	It is not anticipated that this will result in an inconsistent application of the regulations. The process for addressing the issue raised in the comment is outlined in 18 AAC 75. 355(c).	**N**

	In addition, to be considered ARARs, the requirement must be consistently applied by the state. [42 USC 9621 (d)(4)(E)] General goals that express legislative intent but are non-binding are not ARARs. State guidelines or advisories will not be ARAR but may be "to be considered" (TBC) guidance. [Ref 40 CFR § 300.400(g)(3)]		
15.	ADEC proposes to amend the cited rule to include the following sentence. "Where the department determines that toxicity data is [sic] insufficient to establish a cleanup level for a hazardous substance or a pollutant as defined under AS 46.03.90(20) that ensures protection of human health, safety, and welfare, and of the environment, the department may require a responsible person to provide an alternative source of drinking water for the affected parties or implement other institutional controls under 18 AAC 75.375 until a cleanup level is established under 18 AAC 75.345(b)(2), (b)(3) or (b)(4)." The proposed language provides no threshold criteria and ADEC offers no guidance regarding how it will determine that "toxicity data are insufficient to establish a cleanup level." Moreover, the proposed rule would appear to afford ADEC unbounded authority to require alternative drinking water for an indefinite period of time. ADEC should strike the proposed language because it fails to reflect best science (or any science for that matter), is vague, is contradictory to its own polices for deriving soil and groundwater cleanup levels, and is inconsistent with USEPA policy.	ADEC has established cleanup values for over 200 compounds thus the situation would be rare and applied to emerging contaminants that are not established in ADEC Tables. As noted in the Risk Assessment Procedural Manual in section 3.3.1, ADEC uses a toxicity hierarchy. When values are not available from a tier 3 source, criteria consistent with The Environmental Council of the States and EPA white paper on tier 3 toxicity values (ECOS, 2007 and USEPA, 2013a) would be a starting point. Many factors go into developing a toxicity value and its applied use. Experts from the field like EPA and/or the National Toxicology Program would need to be consulted. Setting specific criteria would inevitably fail to anticipate all of these variables, but justification for the decision would be provided when the determination is made.	**N**
16.	18 AAC 75.341 states that chloromethane is a toxicity surrogate for hydrazine and methyl mercury (Kd value only). These three chemicals do not have similar fate and transport properties.	The commenter is correct. Upon further research, the Department will use a hydrazine Koc of 2 L/kg based on the National Institute of Health's Hazardous Substances Databank. The Department will use a methyl mercury Kd of 2,700 ml/g based on U.S. EPA. 1997 Mercury Study Report to Congress. EPA-452/R-97-005. Office of Air Quality Planning and Standards and Office of Research and Development.	**Y**
17.	If soil cleanup levels are lowered for some of the proposed contaminants, it will sometimes be impossible to obtain backfill material that meets the new levels since background contaminants will exceed the cleanup levels.	The department agrees this is a concern and is developing guidance on how to address this type of situation.	**N**
18.	Lower soil cleanup levels likely will require more indoor air studies. Hopefully DEC will use common sense and not	The Department will continue to use the 2012 Vapor Intrusion Guidance to evaluate indoor air.	**N**

	require air studies at sites with low contaminant levels and/or low usage buildings.		
19.	ADEC proposes to amend 18 AAC 75.345(c) to add "the presence of sensitive subpopulations who respond biologically to lower levels of exposure to a hazardous substance" as a factor ADEC may consider to determine if a more stringent cleanup level than listed in Table C is necessary "to ensure protection of human health, safety or welfare, or of the environment . . . In addition, at 18 AAC 75.340(i)(2), ADEC adds to its reasons for requiring a site-specific analysis "the presence of sensitive subpopulations who respond to lower levels of exposure to [sic] hazardous substance." At 18 AAC 75.990, ADEC defines "sensitive subpopulation" to mean "a group of individuals that is at increased risk of some adverse health event or outcome after exposure to a contaminant." However, the ADEC definition offers no criteria or guidance as to when a "group of individuals is at increased risk of some adverse health event or outcome" and when ADEC would require use of a groundwater cleanup level lower than those listed in Table C. In fact, ADEC is already protecting sensitive subpopulations by using RfDs that are specifically designed to protect sensitive subpopulations. Some RfDs are derived from developmental toxicology studies in which pregnant laboratory animals are dosed during the gestation period at the critical time of organogenesis to determine if the developing fetus is harmed by the mother's exposure to the chemical. If so, then the RfD is derived from that study specifically to be protective of the sensitive subpopulation of developing fetuses. Such RfDs are applied to children and adult risk assessments even though protection of a developing fetus is not relevant for a six-year old child receptor. Such RfDs are used to set cleanup levels using the standard equations outlined in the *Risk Assessment Procedures Manual* (2015), and the cleanup levels listed in Table C are specifically derived to be protective of this most sensitive subpopulation. ADEC confirms in its response to Question #38 that it will use toxicity values that are only relevant to receptors of reproductive age to set cleanup levels based on	Due to unforeseeable variables having to do with availability of toxicity information, the number of individuals affected, the duration, and the specific nature of their sensitivity (pregnancy, elderly, type of illness or other vulnerability), setting specific criteria would inevitably fail to anticipate all of these variables. The department must retain discretion to effectively apply this regulation on a case by case basis. Peer-reviewed data documenting how sensitive subpopulations are impacted by a chemical at a certain concentration would be required to develop a cleanup level (under Method 4) that is protective of said sensitive subpopulation. Any more prescriptive language to set specific criteria would inevitably fail to anticipate all of the variables that could be associated with the exposure and advancement in science and could ultimately have the effect of being overly burdensome on the regulated community. Infants, young children, pregnant women, and the elderly are common examples of sensitive subpopulations. When these subpopulations are exposed to contamination, additional assessment may be required to ensure the default cleanup levels are protective. It is correct that some RfDs do take sensitive subpopulations into consideration, but this is not the case for every compound. In addition, increased exposure may also occur which is not captured in the default exposure scenarios used to generate the default cleanup levels. As the scientific knowledge about the determinants of susceptibility expands, our ability to identify vulnerable subpopulations will improve.	**N**

	exposure scenarios for children aged one to six if they are in the database used for the EPA Regional Screening Levels. ADEC addresses the issue of "sensitive subpopulations" in its response to Question #37, by stating that it will not establish any criteria beyond the criteria included in the definition found at 18 AAC 75.990. ADEC should expressly state so in the amendments.		
20.	The Department of Defense (DoD) welcomes the use of risk-based cleanup goals in our cleanup program as it is consistent with the Defense Environmental Restoration Program (DERP) objectives for cost-effective cleanup that is protective of human health and the environment. The DERP conducts environmental restoration activities in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the National Contingency Plan (NCP) and Executive Order 12580 regarding lead agent authority. Please note that state environmental laws such as 18 AAC 75 and proposed revisions apply only as provided by CERCLA and judicial interpretations thereof. CERCLA 42 USC§ 9620(a)(l) and 42 USC§ 9621(d)(2) limit the role of state laws on federal facilities to the applicable or relevant and appropriate requirements (ARARs).	We thank you for your comment.	**N**
21.	The language of Section 18 AAC 75.345(d) would require actions to be taken when there is no ARAR and a potentially unacceptable risk has not (and cannot) be demonstrated. Furthermore, the only "exit strategy" for providing alternate drinking water could potentially either take years to be developed or may never be agreed to, so the state is essentially requesting that alternate drinking water be provided in perpetuity when no risk has been demonstrated. This type of action and resultant expenditure without an ARAR or a potential risk is not consistent with CERCLA and should be revised.	By statute (AS 46.03.020(10) and AS 46.03.900(20)), the department is authorized to develop standards and require cleanup of contamination that is potentially harmful to human health or the environment. When the public is exposed to contaminants that have suspected toxic effects, there is the potential for the harm from these effects to be irreversible if protection, such as an alternative source of drinking water, is delayed pending data to confirm those very health effects.	**N**
22.	The CSP lists 16 of the many PAHs, which are naturally occurring and found in food, petroleum, and products of combustion. Naphthalene is ~0.3% of typical Alaskan diesel fuel.	It is well documented that combustion can spread PAHs over a large area. As the commenter notes, the Department does not require sampling of asphalt where it is being used for its intended purpose, and discusses contribution from off-site PAH sources with responsible parties. The Department does not require responsible parties to remediate pyrogenic contamination.	**N**

	PAHs are common constituents of asphalt and sealers, especially older coal tar based products. The CSP has an unwritten policy to simply not test asphalt, since it obviously exceeds limits for diesel and residual range organics. Milled recycled asphalt pavement (RAP) is commonly used for highways, driveways, and parking lots; it is difficult to visibly discern from gravel or by chemical analyses from the ubiquitous oil leaks and fuel spills. Soil in burned forest and tundra often exceeds proposed limits for naphthalene. Urban backgrounds often exceed limits for other PAHs, especially if coal was used. Soils impacted by forest fires exceed naphthalene and Cr(VI) levels, at least until naturally attenuated. Disposal of ash from any source onto land or unlined C&D landfills could require "a discussion with the CS project manager", etc.		
23.	If tested by EPA methods, asphalt and RAP will exceed cleanup levels for As, Cr, GRO/BTEX, DRO, RRO, and naphthalene. Since RAP is so widely distributed, expect "a discussion…", etc. for site characterizations near roads, driveways, parking lots, asphalt plants, and DOT facilities. "Cleaning" soil to CSP's proposed levels is ludicrous. The root cause is the CSP's presumption that a risk based screening level regardless of source can become a cleanup level by simply moving a decimal. While convenient, it avoids the all-important risk management, where common sense, cost feasibility, and balancing health vs remediation risks force modification of screening levels into site cleanup levels.	Reclaimed asphalt pavement (RAP) is a known building material and the department is aware that it contains metals and petroleum hydrocarbons. The department would not require a party to clean up a legally constructed driveway or parking lot. However, an illegal dump site filled with RAP would need to be made safe for human health, welfare, and the environment.	**N**
24.	340(e) (1) ….What is the purpose of the bold text that in the following excerpt: "a responsible person may propose for the department's approval **or the department may set** a site-specific alternative cleanup level"?	In cases where no responsible person can be found (i.e. orphaned sites) or where the responsible person has not set a cleanup level that is acceptable to the Department, the Department needs to be able to set a cleanup level at that site.	**N**
25.	Soil cleanup levels tables use units of mg/kg, whereas the groundwater cleanup levels table uses µg/L. Please use consistent units to avoid confusion and to be consistent with similar requests frequently received from ADEC personnel.	Soil is solid and groundwater is liquid, so unless groundwater is reported by mass it is impossible to use the same units. Some in the regulated community do not prefer the use of scientific notation and others do not prefer extended decimals such as 0.000700 mg/L. Since most labs report analytes in ug/L, and it avoids the aforementioned alternatives, the Department has chosen to use ug/L for groundwater. This also avoids conversion errors when lab data is transferred to data summary tables in environmental reports.	**N**

26.	"The department will develop a site-specific cleanup level for a hazardous substance not listed under 18 AAC 75.341(c) using the procedures set out in the department's Risk Assessment Procedures Manual adopted by reference…" This fails to establish a consistent cleanup standard and therefore would not be considered an ARAR. This applies to other areas of 18 AAC 75 that include determining cleanup levels on a site-specific basis.	The department does not concur with the statement of the commenter. The section cited prescribes a specific process to be used in developing a cleanup level for a contaminant that is not listed, a process which will be consistently applied.	**N**
27.	Cleanup levels for the most part are overly conservative to begin with and forcing sites into stricter cleanup mode is a waste of time and a waste of money. Remediating to the proposed soil cleanup levels would cause more harm than good at most sites.	In order to meet its statutory obligation, the department sets cleanup criteria that will ensure the protection of human health, welfare and the environment. To establish these criteria, the department uses a scientifically defensible process that is based on risk, except where risk-based concentrations exceed solubility or saturation levels, (free phase product). The generic cleanup criteria in Tables B1 and C are necessarily conservative to cover a range of hydrologic, soil and climatic conditions across a continental land mass that is more than half the size of the contiguous United States. If a responsible party deems the cleanup levels to be inappropriate for their specific site, they have the option to propose site-specific cleanup levels under method three for the department's review and approval.	**N**
28.	18 AAC 75.341(c) - Table B1 and 18 AAC 75 75.341(d) - Table C contain cleanup levels for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) that are based on draft criteria and documents from EPA, particularly EPA's February 2014 draft health effects documents for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS). Until final versions of the health effects documents are published by EPA, the cleanup levels for PFOS and PFOA cannot be considered to be final. These draft EPA documents (dated February 2014) are stipulated as "Draft-Do not Cite or Quote." Therefore, cleanup levels based on draft documentation should be removed from the tables.	Because 2014 draft health effects documents cited are not yet final, the department has recalculated the cleanup criteria for these compounds based on EPA's 2009 subchronic reference doses, with an uncertainty factor of 10 to convert these to chronic values.	**Y**
29.	During the (Oct 14, 2015?) public meeting the ADEC said several times that they wanted the tables to be risk based. However, several of the Table B1 values use the Csat value in place of a risk based value, and several of the Table C values use the solubility value in place of a risk based value.	The commenter is correct. In some cases the risk-based cleanup level for compounds listed in Tables B1 and C exceeds the solubility of the compound, which results in the presence of free product. In these cases, the cleanup level is set at the solubility in conformance with 18 AAC 75.325(f).	**N**
30.	The FAQs state that cleanup levels are based on the toxicity values hierarchy; however some toxicity values do not meet the EPA classification of Tier 1, 2, or 3 values.	The majority of the toxicity values used to generate the proposed cleanup levels in 18 AAC 75 meet the criteria established in the DEC toxicity hierarchy However, in some cases surrogates or other justification are used and footnoted in the regulation table.	**N**

31.	345(b) (1) and 345(b) (2), and the PCCL lock in the use of the Andelman volatilization factor for Methods Two and Three. The Andelman volatilization factor appears to be overly conservative in that it has been documented to yield results above maximum theoretical vapor concentrations. The EPA regions that I talked to, use the Andelman volatilization factor for screening but not for risk calculations.	The Andelman approach is adequate for volatiles, but it will tend to overestimate exposure if semivolatile constituents are included. This is not the case for the proposed regulation as the Andelman is only applied to volatile organic compounds, but because the department did not explicitly state that in the PCCL some parties were not aware of it. A statement has been added to the PCCL to emphasize that the Andelman approach is only used for volatiles. To state the Andelman factor is not used in risk calculation is incorrect. The Andelman factor is routinely used in risk assessment and cited in EPA Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual Part B, Development of Risk-based Preliminary Remediation for assessing the risk of volatiles from household water use. Several risk assessment performed in Alaska from Department of Defense sites have proposed the assessment of the pathway for volatile vapor from groundwater using the Andelman Factor in their work plan. Two recent ones are Galena Airforce Base and Fort Wainwright (which has EPA oversight and the work performed by the Army Corps of Engineers.). Experimental studies have demonstrated that the internal dose of VOC from showering can be comparable to the exposure dose resulting from drinking the water (Jo et al 1990 a and b) thus the inclusion of the pathway is important for determining preliminary cleanup goals in the cleanup tables. References: EPA Risk Assessment Guidance for Superfund Volume 1 Human Health Evaluation Manual (Part B) 1991 Jo WK, Weisel CP, Lioy PJ. 1990a. Chloroform exposure and the health risk associated with multiple uses of chlorinated tap water. Risk Analysis 1990 Dec; 10(4):581-5. Jo WK, Weisel CP, Lioy PJ. 1990b. Routes of chloroform exposure and body burden from showering with chlorinated tap water. Risk Analysis 1990 Dec; 10(4):575-80.	**N**
32.	ADEC has indicated their intent is to adopt risk-based values throughout the table rather than deferring to MCLs. However, it appears that a mathematical-only approach was applied across than board, not a risk-based approach. Some proposed cleanup levels are greater than pure products and less than current method detection limits. For example:	The error has been corrected.	**Y**

	Chromium III MTGW is 5.34E+08 =534,000,000. This is 534 million parts per million.		
Cleanup Levels - Metals			
33.	Cleanup levels are given for chromium (III), chromium (VI), and chromium (total). This is confusing. It is accepted that Cr(VI) is a carcinogen and is more toxic than the Cr(III) form. The risk-based values for total chromium assume that all chromium in soil or groundwater consists of hexavalent chromium. This assumption will be incorrect at many sites. In general, hexavalent chromium concentrations are low relative to trivalent chromium concentrations in surface water.	The Department has added a footnote into the Tables B1 and C that clarify that the trivalent chromium cleanup level applies at a site unless a hexavalent source has been identified or suspected.	**Y**
34.	The migration to GW standard for lead is 0 mg/kg. Is this a mistake?	This is not a mistake. There is no consensus RfD or CSF for inorganic lead, so it is not possible to calculate cleanup levels as we have done for other chemicals. EPA considers lead to be a special case because of the difficulty in identifying the classic "threshold" needed to develop an RfD. EPA therefore evaluates lead exposure by using blood-lead modeling, such as the Integrated Exposure-Uptake Biokinetic Model (IEUBK). The EPA Office of Solid Waste has also released a detailed directive on risk assessment and cleanup of residential soil lead. The directive recommends that soil lead levels less than 400 mg/kg are generally safe for residential use. For water, we use the EPA Action Level of 15 µg/L. We do not calculate a migration to groundwater cleanup level.	**N**
35.	Several of these compounds are part of the natural human diet. Some of these compounds are vital for human health. It is accepted that Cr(VI) is a carcinogen and is more toxic than the Cr(III) form, which is essential for human health.	The Department has added a footnote into the Tables B1 and C that clarify that the trivalent chromium cleanup level applies at a site unless a hexavalent source has been identified or suspected. The department concurs that Chromium III is an essential element in humans but the recommended daily intake of 0.050 to 0.200 mg/d is far lower than the reference dose of 1.5 mg/kg/d proposed for Cr III. At some appreciable level even essential metals can be toxic.	**Y**
36.	Arsenic and chromium are naturally elevated in many parts of the state and most aquifers are likely to exceed the cleanup value. Much soil also naturally exceeds the cleanup level. The arsenic and chromium cleanup levels are much too stringent. Are we going to have to do background studies at every site? Further clarification is warranted for Note 15 "Due to naturally occurring variable concentrations throughout the state, arsenic must be evaluated as a contaminant of potential	The Department has added a footnote into the table that clarifies that the trivalent chromium cleanup level applies at a site unless a hexavalent source has been identified or suspected. For arsenic, the concentrations at a site will be determined to be natural background unless anthropogenic contribution, through an activity, or mobilization via another introduced contaminant has been identified or suspected.	**Y**

	concern on a site-specific basis". This could be interpreted along with the 2009 technical memo, "Arsenic in soil" to mean that only sites with a known or suspected source of anthropogenic arsenic would require background studies for arsenic or arsenic sampling however, this isn't stated in the proposed regulations.	The 2009 memorandum *Arsenic in Soil* will be updated and clarified to reinforce this point and more clearly define the evaluation process required by responsible parties.	
37.	The 2015 proposed groundwater cleanup value for arsenic is 0.52 ug/L which has been lowered from the existing level of 10 ug/L. The new cleanup level is significantly less than the EPA drinking water MCL of 10 ug/L which was adopted in 2006.	See general response on the question of MCLs versus cleanup levels. Specific to arsenic, EPA has established a Maximum Contaminant Level Goal (MCLG) of 0. The proposed ADEC cleanup level is greater than zero, and corresponds to a cancer risk of no greater than 1 in 100,000.	**N**
		Cleanup Levels - MCLs	
38.	At federal facility sites, the cleanup levels of 18 AAC 75 are potential CERCLA ARARs. They do not, however, constitute a basis for action in a remedial investigation at federal facility sites. A basis for action for groundwater requires that a federal or state non-zero Maximum Contaminant Level Goal or Maximum Contaminant Level (MCL) is exceeded and there is a potential or actual exposure pathway; or ecological risk is determined unacceptable; or cumulative cancer risk exceeds one in ten thousand (10^4); or the non-cancer risk exceeds a hazard index (HI) of 1. Since 18 AAC 75 no longer uses MCLs, a DoD remedial action (following a Remedial Investigation) will generally only be triggered at federal facility sites when a federal or more stringent State MCL or non-zero MCL goal is exceeded, or a risk assessment finds that cumulative cancer risk exceeds 10^{-4}, or a non-cancer HI exceeds 1.	The department does not concur with the statement of the commenter. State ARARs are not limited to MCLs or MCLGs, but also include other standards where established and available at the state level, such as Table C values for groundwater in 18 AAC 75.345.	**N**
39.	In some cases, cleanup levels are more stringent than the EPA's Maximum Contaminant Level (MCL) standards for drinking water. I can't think of any situations where the groundwater cleanup levels for metals should be more stringent than drinking water standards as drinking water represents a more direct pathway to a receptor.	The drinking water Maximum Contaminant Levels (MCLs) are not calculated consistently based on risk. Some of the MCLs are less protective than the department's 1 X 10^{-5} risk standard, others are more stringent. MCLs are not routinely updated in line with the most recent available toxicity information. The values do not accommodate all exposure risks for children, do not account for mutagenic risks, and do not account for the exposure to volatile compounds through the inhalation pathway during bathing. Finally some MCLs are based on the best available technology to treat the water. As a result of these factors and varied approaches for how MCLs are derived, the department has selected a single consistent approach for setting groundwater cleanup levels that are safe for adults and children based on current information about exposure and toxicity.	**N**
40.	The proposed groundwater cleanup levels contain values less than EPA drinking water standards. MCLs for protection of	The department does not concur with the statement of the commenter. State ARARs come into play when the standards are more stringent, and are not limited	**N**

	human health for groundwater consumption would not be consistently applied by the state if these new cleanup levels are adopted, potentially causing issues with legality of application of groundwater ARARs.	to MCLs or MCLGs, but also include other standards where established and available at the state level, such as Table C values for groundwater in 18 AAC 75.345.	
41.	The elimination of EPA Maximum Contaminant Levels as cleanup goals, as implemented by Table C in Section 18 AAC 75.345(b) causes a vast discrepancy between different regulatory programs that establish "safe" levels. Since Alaska relies on the EPA MCLs for drinking water protection, the state is essentially sending mixed messages regarding "safe" levels in groundwater and in drinking water. For example, 18 AAC 70 allows the Municipality of Anchorage to discharge wastewater with arsenic concentrations of 36 µg/L dissolved. 18 AAC 75 does not allow the use of dissolved metals values or concentrations exceeding 0.517 µg/L. Consistent application of regulations is not happening	The drinking water Maximum Contaminant Levels (MCLs) are not calculated consistently based on risk. Some of the MCLs are less protective than a 1 X 10^{-5} risk standard, others are more stringent. MCLs are not routinely updated in line with the most recent available toxicity information. The values do not accommodate all exposure risks for children, do not account for mutagenic risks, and do not account for the exposure to volatile compounds through the inhalation pathway during bathing. Finally some MCLs are based on the best available technology to treat the water. MCLs or MCLGs that are more stringent may be considered under 18 AAC 75.345 (c)(4). The example cited by the commenter is referring to a permitted discharge, not a contaminated site. Groundwater cleanup levels apply to unpermitted discharges.	**N**
Cost of Complying with the Regulations			
42.	The economic analysis is insufficient. More sensitive analysis for analytes will be significantly more expensive. Other factors resulting in additional costs include the potential for more site-specific risk assessments, additional sampling, and collection of site-specific parameters for soil background levels, and hydrogeologic conditions. Additional long term management costs will be incurred. Promulgation of the new rules should be postponed until a better evaluation of the cost to the regulated community has been completed.	The Department (including an Economist III) conducted an economic analysis to the best of its ability, but lacks the necessary cost information on various factors, options and alternatives to provide a quantitative estimate with any degree of accuracy of the cost to municipalities, state agencies and private persons of implementing the proposed regulations versus the cost of not implementing the regulations. Costs to municipalities, state agencies and private persons with the changes: The lower cleanup levels may require additional sampling, more sophisticated laboratory analysis, potentially more waste disposal of contaminated soil and water, and/or increased operation of remediation technologies. However, an array of alternatives exist for addressing contaminated sites. These include using the default cleanup levels under method two, proposing site specific cleanup levels under method three including the option of using a fate and transport model; or proposing cleanup levels under a method four risk assessment. In addition, a wide variety of remediation alternatives exist for addressing contaminated sites. Furthermore, an RP can propose a commercial industrial cleanup scenario, or a cleanup that includes the use of engineering and other institutional controls to control exposures at a site. With these alternatives and variables, it becomes difficult to estimate the costs of one alternative over another in conjunction with the changes in the cleanup criteria. In addition, the department is not provided information about the costs incurred by responsible parties in their cleanup of	**N**

		contaminated sites. Finally, for cleanup levels that have become less stringent, cleanup costs may be reduced. Costs to municipalities, state agencies and private persons without the changes: The current regulations are not protective of children. Due to their smaller body mass, children are more susceptible to harm from pollutants. The new cleanup levels are protective of children. The Department does not have data such as types of medical treatments needed or medical costs for childhood cancer treatment needed to calculate the cost of the increased childhood illnesses and deaths. In addition, due to out of date toxicity information and equations, current cleanup levels and existing regulatory language are not adequately protective of the general population, for example for emerging contaminants where health risks are suspected but limited toxicity information is available.	
43.	ADEC has proposed changes without fully explaining the basis for, offering a rationale for, or why the changes need to be made at this time. A justification besides that new science and new toxicity data (and draft toxicity data) has become available is warranted. During this economically challenging time for Alaska, and by your own admission that private businesses are more likely to face additional costs, these changes need to be postponed until the price of oil goes back up as the price of natural resources (oil, natural gas) directly effects Alaska's economy both in and out of the oil industry (e.g. the three legged stool). Toxicity data alone and change for the sake of change does not justify the significant additional expenses private businesses will incur when there has been no evidence of real impacts (e.g. cancer clusters or other health impacts in the population).	The department provided the detail of the changes in the August 26, 2015 public notice; the reason for the proposed action in the Additional Regulations Notice Information; in the Summary of Proposed Modifications, Section-by-Section Analysis; in the Frequently Asked Questions posted on the DEC Contaminated Sites Program regulations page; and at a series of three public workshops. The department is charged with protecting human health and the environment; this responsibility includes setting contaminant cleanup levels that are safe for human exposure based on sound science.	**N**
		General Comments	
44.	I think it would benefit everyone (ADEC, RPs, consultants, and the public) to have input from environmental professionals outside ADEC, in a working group format, while ADEC is developing the revisions to the regulations and guidance documents (i.e. prior to the public comment period). I think this approach would help ADEC, RPs and consultants vet technical problems, provide solutions to problems (instead of identifying a potential problem but not providing guidance for how to solve the problem), wordsmith documents, improve understanding and communication regarding what the issues are, and facilitate implementation of the regulations once they are promulgated.	The Department seeks input from responsible parties, environmental professionals, and the public through a number of channels, including public scoping and public comment periods on proposed regulations packages. The Department also receives continuous input from responsible parties and environmental professionals during the day-to-day operations of the CS program. Working groups are another avenue for regulations development, but they are not the best option for every regulations package and in this case, the Department chose other methods for obtaining input and feedback. The Department may consider the use of workgroups for future efforts.	**N**

45.	There is not enough discussion of the changes and there are no examples of the changes to understand how the proposed changes will work. Several proposed changes identify an issue but don't provide information on how to analyze or resolve the problem (e.g. background metals concentrations, compounds with cleanup levels below reporting and/or detection limits).	It is not clear what types of examples they commenter seeks, but the Department provided the detail of the changes in the August 26, 2015 public notice; the reason for the proposed action in the Additional Regulations Notice Information; in the Summary of Proposed Modifications, Section-by-Section Analysis; in the Frequently Asked Questions posted on the DEC Contaminated Sites Program regulations page; and at a series of three public workshops. Background metals and cleanup levels below laboratory detection limits are both discussed above.	**N**
46.	325(g)……The words "*Instructions for determining*" cumulative risk have been inserted into 325(g) (but not into 325(H)). I assume this change is intended require that cumulative risk be calculated essentially, exactly as shown in the cumulative risk document -- however, the cumulative risk document is technically in error. Changes to the cumulative risk document need to be made and the regulations don't need to require that the cumulative risk calculation is performed as shown in the cumulative risk document. Was there a real problem with the old wording of the regulation?	The minor language change is to remove the term "guidance" and clarify that the procedures for calculating cumulative risk in the adopted by reference document are a regulatory requirement. The commenter does not provide specific comments about what is deemed to be "technically in error" with respect to the document, so the department is unable to provide a response to this portion of the comment.	**N**
47.	What is shown in the proposed regs following 340(e) (2) and currently listed as 340(e) (2) (D) appears to be mislabeled. Should it be listed as 340(e) (3) or 340(f) or 340(e) (2) (A)?	We have reviewed the proposed changes and find that they are correct; however, if there are numbering errors with existing unchanged sections, it will be corrected prior to filing.	**N**
48.	"(2) human exposure from ingestion, dermal [DIRECT CONTACT] or inhalation of particulates or a volatile hazardous substance must be attained in the surface soil and the subsurface soil to a depth of at least 15 feet, unless an institutional control or site conditions prevent human exposure to the subsurface soil;" Depth to "at least 15 ft" is open ended. The compliance depth should either be tied to a trigger to extend the depth from the preset minimum as necessary or should be set at a fixed depth. Using the same clean up value from surface to 15 ft depth seems overly conservative in that residential and recreational exposures would be limited to a much shallower depth. The 15 ft depth exposures would only be associated with construction activities utilizing heavy equipment where the exposure would probably be of relatively short duration. Risk analysis of that exposure would likely result in a higher clean up number.	The language cited by the commenter has not changed since it was adopted in 1999. The 15 feet is the conservative estimate of the maximum depth for typical construction activities. The language will be changed to state "a depth of 15 feet", removing the words "at least".	**Y**

49.	Although cleanup levels for petroleum hydrocarbons are not being changed at this time, the often associated site contaminants (BTEX, PAH's) are changing, thereby affecting many hydrocarbon impacted sites. It is misleading to imply to the public that hydrocarbon impacted sites would not be effected by these regulation changes.	The department concurs that sites where groundwater is contaminated with BTEX compounds, for example, may have a longer period of remediation to reach criteria for unrestricted closure. However, when bulk hydrocarbon contamination in soil is removed, it typically removes most if not all of the individual constituents in BTEX and PAHs that are associated with petroleum hydrocarbon contaminated sites.	**N**
50.	This package is being released too close to the 2016 field season. For sites already underway and in the investigation phase, any approved workplans and reports should be grandfathered and follow the existing regulations. Remedial actions at ongoing remediation sites with approved work plans should be allowed to use the previous cleanup levels and/or previous methodology. It is recommended that the effective date of these revised regulations should be pushed to 2017.	Although there is no ideal time to issue new regulations, as a site may be at any stage in the cleanup process at a given time, the department is aware of the challenges for the regulated community when regulations are amended. The Contaminated Sites Program will be working with responsible parties to determine how to apply the changes considering the circumstances at each site and its stage in the cleanup process.	**N**
51.	This regulations package should be combined with other regulations packages, such as revisions to the Risk Assessment Procedures Manual and revisions to the petroleum cleanup levels.	Large regulation packages take longer to develop and are burdensome on the public by providing too many changes to review and comment on. If the package takes longer than a year to reach the filing stage, the project is deemed "stale". The Department strives to find a balance between larger complex packages that at times may be necessary, and those that cover distinct topic areas that allow the public to focus their review and comments on particular subject. The department gives careful thought to each set of regulation changes it develops and the impact on the public to review those changes.	**N**
52.	In general, we are not in favor of ADEC opening any closed site when new regulations are promulgated. While we recognize that regulations can change based on both science and policy, we think it is generally unfair to re-open a site that was closed under a previous closure regime unless some physical condition(s) changes at the site such as a change in use, subdivision of parcels, new observations of contaminants/contamination, or other possible concerns. The Department already has a mechanism in place for these events since all "closure" letters have a "re-opener" clause. In the case of existing closed sites, we think it will be better for all parties, including the Department, to not try to re-evaluate the previous results compared to the new standards. Property owners and/or Responsible Parties should only be held to the laws and regulations that were in place when the "offence" occurred. We recommend that the Department	The Department understands the concern with re-opening closed sites. Closed sites will be carefully evaluated before a decision to re-open is made. This will include a review the concentrations remaining at the time of closure; whether there is a complete human health exposure pathway present, such as consumption of groundwater that had been documented to be impacted; and determining if additional sampling should be conducted or institutional controls applied, before a decision will be made to re-open a site. However, if this occurs, the department does have the authority to re-open a site where a confirmed risk is identified, as the commenter acknowledges.	**N**

	considers a "wait-and-see" approach on how the closure process changes with the revised regulations and then potentially re-evaluate sites that have on-going ICs.		
53.	ADEC PMs are inconsistent and overly conservative. ADEC representatives indicated that a responsible party working to clean up a site would be able to work the with appropriate ADEC project manager to reach clean up decisions. Yet, without clear guidance via regulations, each ADEC project manager may see the same site differently. This is especially problematic when considering personnel changes. The proposed regulations are subject to considerable discretion in application and will result inconsistent cleanup decisions. For example, subjective decisions will be made when routine cleanup limits are not analytically achievable. A more formal procedure is needed to enable project decisions to be made more clearly, efficiently, robustly, and consistently.	If a responsible party disagrees with a project manager's decision or an interpretation of the regulations, the responsible party is encouraged to raise the matter with the project manager's supervisor. In addition, for federal organizations such as the commenter, the Department enters into Federal Facility Agreements (FFAs) with the responsible party. Those FFAs specifically include a dispute resolution process.	**N**
54.	The individual 'known' historical fuels such as gasoline, diesel, arctic diesel, and other fuel oils are the predominant types of spills at old sites and do not require metals analysis, but it is nearly impossible to prove the negative and ensure no waste oil, used oil, or unknowns were spilled as a particular historical site, thus leading to regulatory project managers pushing for metals analysis at many sites	The determination of potential compounds of concern at a site begins with an evaluation to identify current and past activities, periods of activity, products used or generated, and other sources. If metals are determined to be a potential compound of concern based on the evaluation, then analysis is required. If results indicate metals concentrations that are indicative of natural background, then a background determination can be made. If agreement with the project manager on compounds of potential concern cannot be reached, the responsible party is encouraged to raise the matter with the project manager's supervisor.	**N**
55.	In general I support the proposed changes. I do regret not attending the public workshop.	Comment noted.	**N**
56.	(c) says the department may set a more stringent cleanup level than the applicable level under (b) of this section, if the department determines that a more stringent cleanup level is necessary to ensure protection of human health, safety, or welfare, or of the environment, and based on actual onsite and actual or likely offsite uses of the groundwater that are likely to be affected by the hazardous substance. This is not substantive and will be difficult to apply consistently; therefore it likely will not be an ARAR.	The department does not concur with the statement by the commenter. The department believes that this is a substantive requirement and will be applied consistently.	**N**
57.	Sections 18 AAC 75.325(g) and 18 AAC 75.325(h) call for estimated cancer risk and non-carcinogenic hazards to be rounded to one significant figure. The proposed Alaska cleanup levels are reported to three significant figures. This assigns an artificial level of precision and accuracy to both the calculations and the analytical laboratory methods that will be	The department has modified the cleanup levels to a maximum of two significant figures.	**Y**

	used to compare to the risk-based cleanup levels. It is recommended to round the proposed cleanup levels to a maximum of two significant figures since requiring three significant figures in a promulgated standard overstates the accuracy of both the cleanup levels and laboratory analytical methods.		
58.	While not a proposed revision, text in sentence three of 18 AAC 75.345(i) states "Unless otherwise approved by the department, a responsible person shall conduct monitoring quarterly for at least one year to establish the concentration trend." Considering some sites may be inaccessible or have frozen wells, or might already have existing data to establish concentration trend, it should not be necessary to collect additional quarterly data for these sites.	Comment noted; alternatives for obtaining groundwater data that represent the site conditions may be discussed with the assigned project manager.	**N**
59.	After the public comment period ends, the ADEC will either adopt the proposed regulation changes or other provisions dealing with the same subject, without further notice, or decide to take no action. By ADECs own admission, the language in the final regulations may be different from that of the proposed regulations. If that in fact becomes the case, and significant changes in the final regulations are made, then a new public comment period should be announced before the new regulations are promulgated.	While changes made to address the comments received do not require additional public notice, the Department is nevertheless re-issuing the revised package for additional public review and comment.	**N**
		Institutional Controls	
60.	18 AAC 75.340 (e)(3)(D) Consent of and agreement to create, maintain, and abide by institutional controls from each landowner who is affected by the contamination at the site that a cleanup level less stringent than a cleanup level appropriate to residential land use is appropriate for the site. Requiring land owners affected by contamination to create and maintain institutional controls where a cleanup level is less stringent than a level appropriate for unrestricted land use is impractical and will delay many cleanup efforts in negotiations, especially when the landowner is the Department of Natural Resources or the Bureau of Land Management (which is the case in much of the North Slope of Alaska). Additionally, some clarification and an example of a form is needed regarding the type of agreement that would be appropriate between the land owner and the RP (e.g. simple written agreement, notarized agreement, legal agreement).	The department has decided not to adopt the proposed changes in 18 AAC 75.340 and 345 but rather to maintain the language in these sections as currently written.	**Y**

61.	The additional language proposed in 18 AAC 75.340(e)(3)(D) and 18 AAC 75.340(f)(2) would also seem appropriate for inclusion in 18 AAC 75.345(f) unless use of the term "concurrence" in 18 AAC 75.345(f) differs from the use of "consent of' along with ADEC's proposed amendment language in 18 AAC 75.340(e)(3)(D) and 18 AAC 75.340(f)(2).	The department has decided not to adopt the proposed changes in 18 AAC 75.340 and 345 but rather to maintain the language in these sections as currently written.	**Y**
62.	Under current 18 AAC 75, a responsible person may propose site-specific alternative cleanup levels per 18 AAC 75.340(e) and 18 AAC 75.340(f) under Methods Three and Four, respectively, provided certain requirements are met. As a condition, per 18 AAC 75.340(e)(3)(D) and 18 AAC 75.340(f)(2), the responsible party must obtain "consent of and agreement to create, maintain, and abide by institutional controls from each affected landowner." Clarification is needed regarding the type of agreement that is proposed amendments - a simple written agreement, a notarized agreement, a legal agreement, an ADEC approved agreement, or some other agreement. Recommend that if the department will require a written agreement, that a template be developed by the department and reviewed by the Attorney General's Office so that the agreements are consistent statewide.	The department already requires the responsible party to gain the consent from affected landowners for applying a site-specific cleanup level that is less protective than residual, and to sign a document agreeing to institutional controls. The intent of the language was to provide clearer direction about responsibilities for institutional controls; however, the department has decided not to adopt the proposed changes and maintain the language in these sections as currently written.	**Y**
63.	For ICs on adjacent parcels, the new regulations and FAQ page suggest that the Department will develop a mechanism so that ICs can be recorded on non-source properties upon consent from the affected landowners. Overall, we think recording documents on non-source parcels is a bad idea. At a minimum, needs much more exploration and explanation to consultants and other parties at any site that it is considered. Has the Department fully evaluated the legal ramifications of recorded documents on adjacent non-source properties with Title Insurance Companies before these changes are finalized? What will be the course of action if adjacent landowners will not consent to ICs and it is not feasible to remediate a site to below the required cleanup levels? While we understand the Department's need to obtain landowner consent and facilitating the discussion in these cases, we think it is important that the Department explore these areas completely so as to avoid the inadvertent damage to property value through unclear or improperly worded recorded documents.	Although he department has decided not to adopt the proposed changes in 18 AAC 75.340 and 345, 18 AAC 75.375 currently requires consultation with each affected landowner prior to establishing institutional controls. This includes non-source properties that are impacted. To comply with this regulation, the department requires signed agreements acknowledging the institutional controls being established on affected, non-source properties. If signed agreements are not forthcoming from affected landowners, the source property cannot be issued a cleanup complete determination. If the site cannot be remediated to the required cleanup levels, the site will remain open. Comments about clarity and properly worded deed notices are noted.	**N**

64.	(8) The proposed regulation requires responsible parties to obtain concurrence from affected property owners for the creation and maintenance of institutional controls if proposing to not meet the unlimited use and unrestricted exposure cleanup levels beyond the property boundary. In exercising its CERCLA authorities the DoD components do seek to negotiate voluntary Land Use Controls (LUCs) with off-installation property owners whose property has been contaminated by our on-installation releases. This can, where necessary, include the negotiated purchase of restrictive easements and other similar property interests using authority granted under 42 USC §96040). However, in cases where a property owner unreasonably declines to grant permission, the same CERCLA provision grants us authority to condemn property interests where necessary to conduct remedial action and ensure protectiveness. The State of Alaska and ADEC may not impede this statutory authority of condemnation by always requiring an owner's consent. Also, this and other additional LUCs requirements may cause substantial costs to DoD which may need to be evaluated and negotiated on a site-specific basis.	The department has decided not to adopt the proposed changes in 18 AAC 75.340 and 345 but rather to maintain the language in these sections as currently written.	**Y**
65.	"consent of and agreement to create, maintain, and abide by institutional controls from each landowner who is affected by the contamination at the site that a cleanup level less stringent than a cleanup level appropriate to residential land use is appropriate for the site." This requirement may not be achievable and is not consistent with CERCLA authority. USACE has no authority to force a landowner to comply with or agree to land use controls.	The department already requires the responsible party to gain the consent from affected landowners for applying a site-specific cleanup level that is less protective than residential, and to sign a document agreeing to institutional controls. The intent of the language was to provide clearer direction about responsibilities for institutional controls; however, the department has decided not to adopt the proposed changes and maintain the language in these sections as currently written.	**Y**
66.	If an alternative point of compliance is approved, this section requires that the cleanup levels must be met at the property boundary unless a responsible person gains concurrence from any affected neighboring property owner for the creation and maintenance of institutional controls. A responsible party cannot ensure that adjacent property owners will remain compliant with the ICs, this should be the responsibility of the ADEC. What protection does the RP have if the adjacent property owners are lax with IC compliance?	The department already requires the responsible party to gain the consent from affected landowners for applying a site-specific cleanup level that is less protective than residual, and to sign a document agreeing to institutional controls. The intent of the language was to provide clearer direction about responsibilities for institutional controls; however, the department has decided not to adopt the proposed changes and maintain the language in these sections as currently written.	**Y**
Issues not related to the current package			
67.	Revisions to the Risk Assessment Procedures Manual substantially change the calculation of hydrocarbon (DRO,	These comments are related to issues that are not part of this regulations package. They have been noted and will be considered for future packages.	**N**

	GRO and RRO fractions) risk, and therefore have the potential to change cleanup levels and site closure at many DoD sites.		
68.	In the past, ADEC has required methanol preservation for volatile analytes via method SW846-5035A. Published detection limits for the applicable analytical method (SW846-8260B/C) are greater than the proposed clean up limits for several volatile compounds, notably the chlorinated compounds. How does the ADEC intend to address this deviation to the published EPA method?	These comments are related to issues that are not part of this regulations package. They have been noted and will be considered for future packages.	**N**
69.	UST Procedures Manual Table 1 requires that VOCs by 8260B be preserved with Methanol. Note 1 requires the use of EPAs Test Methods for the Evaluation of Solid Waste be used. 2012 September 14th Letter to All Laboratories Performing AK101 and VOC in Soil, Re: Alaska Volatile Organic Compound Soil Preservation Requirements. Requires the use of Methanol for preservation of VOC samples. "If the methanol analysis cannot meet Alaska regulatory cleanup levels and/or project specific action, low level collection and analysis can be approved on a site specific basis for those Compounds of Concern not meeting required levels with the methanol analysis." The EPA has classified the use of 5035A methanol extraction for high level concentration samples, greater than 200 ppb. ADEC has set their program up to require the use of Methanol extraction for regulatory cleanup limits well below 200 ppb. Thus requiring the use of other extraction methods to generate high quality analytical data. But restrict the use of the low level extraction methods to a site specific basis with approval from ADEC. The UST Procedures manual, 18 AAC 75, and laboratory certification program must be brought into sync so that required data can be generated using methods approved by EPA.	These comments are related to issues that are not part of this regulations package. They have been noted and will be considered for future packages.	**N**
70.	It is not clear how the percentages of aromatics and aliphatics were derived. As petroleum products greatly vary in composition and there is no explanation of how the percentages were determined, the percentages seem arbitrary. Even if the percentages are correct (e.g., are 95% upper confidence limits of average values), as toxicity greatly varies by individual compound, small differences in percentages of select compounds at a particular study area can give	These comments are related to issues that are not part of this regulations package. They have been noted and will be considered for future packages.	**N**

	significantly different risk outcomes. Therefore, the scientific defensibility of the approach seems highly questionable. Recommend ADEC present additional technical rationale for the approach being used to evaluate TPH. In particular, explain (a scientifically defensible rationale) how it determined the percentage of aromatics and aliphatics should sum to 120.		
71.	ADEC Implementation of ICs without Landowner Approval and ICs on Adjacent Parcels: Earlier in the year and related to a separate discussion, I was informed that ADEC had an opinion from the AG's office that ADEC could record a Notice of Environmental Contamination (NEC) on a property without the consent/participation of the landowner. During that discussion, I provided my opinion that I could see where that could be helpful with some landowners that utilize stalling/delaying tactics with the Department and try to sell property without disclosing the environmental concern. Based upon a review of the Department's February 2011 Guidance on Using Institutional Controls in Oil and Other Hazardous Substance Cleanups, it is our understanding that these deed notices cannot be removed from the title history, but the effect can be terminated by recording a second notice. If the Department is going to continue with this line of thought, I recommend limiting the number of individuals authorized to approve and implement this type of document recording. Furthermore, has the Department consulted with Title Companies to confirm that such notices will not prevent the transfer of property and issuance of title insurance if the landowners affected by this type of IC or a more stringent IC is imposed because of contamination on a neighboring property?	These comments are related to issues that are not part of this regulations package. They have been noted and will be considered for future packages.	**N**
72.	The following requirement is not scientifically defensible "The point of compliance where groundwater cleanup levels must be attained is throughout the site from each point extending vertically from the uppermost level of the zone of saturation to the lowest possible depth that could potentially be affected…." Chronic risk depends on the mean concentration of the Exposure Unit (EU). A sampling design can defensibly demonstrate the mean concentration of the EU (estimated from a set of samples that represent the Exposure Unit) is less than a decision limit (e.g., risk based	The language the commenter remarks on is not a proposed revision in this set of amendments. This section means that a portion of a site may not exceed cleanup levels and still be considered for closure. Groundwater that is sampled and monitored in a manner that is representative of the contaminated area, determined through a fate and transport analysis, and that, through those date points is shown to meet groundwater cleanup criteria, is determined to meet its point of compliance.	**N**

	threshold or cleanup goal). However, owing to temporal variability and spatial heterogeneity, without exhaustively sampling all of the groundwater, no sampling design can show "point-by-point" compliance (i.e., the contaminant concentration in every possible aliquot of groundwater in the population/aquifer meets the cleanup objective). Recommend revising this requirement to state the mean concentration of the groundwater EU or Decision Unit (DU) must be demonstrated to be less than the cleanup or risk-based thresholds.		
73.	The Alaska Department of Environmental Conservation (ADEC) has proposed to revise several portions of regulation 18 AAC 75.325 that involve a general protectiveness standard. The DoD does not consider a general protectiveness standard to meet the definition of an ARAR, since a state requirement must be specific to the hazardous substance involved to constitute a level or standard of control. A state law stating that all cleanups must achieve a specified cumulative cancer risk level for all contaminants and pathways does not establish a chemical specific requirement, but rather is a generic protectiveness level. Also, even if it is stated that a state protectiveness requirement applies to all individual contaminants present, as 18 AAC 75.325 does, such a general standard is not specific to an individual chemical and therefore not considered a valid ARAR. This pertains solely to remedial actions conducted pursuant to CERCLA. It is noted that at DoD sites where remedial action is conducted pursuant to CERCLA, the proposed Soil and Groundwater Cleanup Levels for chemicals listed in the tables of 18 AAC 75 regulations, once promulgated by Alaska, will constitute valid ARARs as they are chemical specific levels/standards of control, but only if they provide a more stringent level of cleanup than federal standards.	The department does not concur with the statements made in this comment; however, the commenter appears to be providing comments on section 18 AAC 75.325 which is not being proposed for revision under the proposed amendments, except for the update of a document that is adopted by reference.	**N**
Procedures for Calculating Cleanup Levels			
74.	The section states "If a responsible person uses method two for chemicals other than petroleum hydrocarbons under 18 AAC 75.340, the soil cleanup levels must be based on Table B1". The last column of this table has soil cleanup values for the migration to groundwater pathway. A dilution attenuation	The default dilution attenuation factor (DAF) of 13.2 is derived by multiplying the default dilution factor (DF) by the default attenuation factor (AF). These factors, along with a number of other Alaska-specific parameters, were developed by DEC contractor, Harding Lawson Associates in the late 1990s. The department has chosen to use Alaska-specific input parameters when possible rather than EPA	**Y**

	factor (DAF) is used in calculating these soil cleanup values. ADEC used a DAF of 13.2; shown in the ADEC document "Procedures for Calculating Cleanup Levels" dated July 15, 2015. However, this calculation requires several assumptions for site hydrogeological conditions to calculate this DAF: (a) Considering that hydrogeological conditions vary from site to site and these values could be significantly different than in the ADEC calculation, it is recommended including appropriate text in the note for Table B 1 to inform the public that site specific conditions should be used for calculating the DAF and for developing soil cleanup levels for the groundwater migration pathway; (b) EPA uses default DAF of 20 in soil screening guidance documents which state this value to be protective. ADEC documents do not provide reasoning for using a lower value than EPA. It is recommended that ADEC provide appropriate text to clarify the use of a 13.2 DAF instead of the EPA default value.	defaults. Nevertheless, the commenter is correct that site-specific conditions can influence the DAF, therefore responsible parties have the option under method 3 of calculating a site specific DAF for their site using the equations in the Procedures for Calculating Cleanup Levels. The Harding Lawson report has been added to the list of references and Table of Standard Default Factors in the PCCL.	
75.	The Procedures for Calculating Cleanup Levels document needs to identify that the soil inhalation calculations and migration to groundwater calculations for the organic compounds are not correct when NAPL is present.	The cleanup levels evaluate the risk from a contaminant in the soil, vapor or aqueous phase and are necessarily conservative to account for a wide range of soil and hydrologic conditions statewide. The four-phase approach preferred by the commenter may be proposed on a site-specific basis using an approved fate and transport model.	**N**
76.	The relative bioavailability factor (RBA) of 0.6 should be included in the soil ingestion cleanup level for arsenic, consistent with the RSL calculations.	The RBA was included, but due to a formatting error, the table listing the chemical specific parameters was inadvertently truncated. The table has been corrected to show the appropriate RBA.	**Y**
77.	Section 5.4 discusses situations in which VF-based cleanup levels exceed the soil saturation limit. For liquid contaminants, VF-based cleanup levels are set equal to the Csat if greater than Csat. Cleanup levels are described in Section 1.0 as risk-based values. The Csat is not a risk-based concentration and should therefore not be incorporated as a risk-based value. An alternative recommendation is to provide risk-based cleanup levels with a notation for VF-based values to indicate that free-phase product may be present at concentrations above Csat and additional evaluation may be necessary.	The department has added a statement in the introduction of this document stating that cleanup levels are calculated based on risk, but for those where the risk level exceeds the saturation or solubility of the compound, the cleanup level is capped at Csat or at solubility limit.	**Y**
78.	A discussion of soil cleanup levels above the ceiling limit of 10^5 (10% of sample by weight) should be included to make the user aware that assumptions for direct contact may be	A footnote has been provided for risk based calculations that may violate assumptions for soil contact due to the theoretical ceiling limit.	**Y**

	violated at or above this level, and such values should be noted in Table B1.		
79.	The source(s) of chemical-specific parameters (other than toxicity values) in Table 6 should be provided. Although a hierarchy of sources for toxicity values is provided in the *Procedures for Calculating Cumulative Risk*, identifying the sources of toxicity values in the subject document (following Table 6) would also be helpful.	The individual parameters will not be cited, but the hierarchy of sources for chemical specific parameters has been added. All questions about sources for a specific parameter or value, or related information, can be addressed to and will be answered by CS program staff.	**Y**
80.	In section 5.3 it is assumed that the default PEF is 1.36 x 10^9 and not 1.36 x 109 as currently indicated, but this should be corrected to avoid confusion.	Text has been corrected	**Y**
81.	The Introduction section (pg. 1) refers to Table 8 in Appendix B, but there is no Table 8 in the document.	Text has been corrected	**Y**
82.	Section 3.1.3 and other inhalation equation sections should be renamed to incorporate inhalation of vapors as well as particulates, particularly for Section 3.4.3 since the vinyl chloride equation includes only vapor and not particulate inhalation.	Inhalation of volatiles and inhalation of particulates are both included in the inhalation equations. Since both are included in the section, it is titled simply "Inhalation".	**N**
83.	The source of each individual toxicity values for each hazardous substance in the Tables of Section 18 AAC 75.34l(c) should be clearly identified. While the FAQs state that DEC employs a tiered approach to determining toxicity values, it is not at all transparent as to when a toxicology value was determined to be unavailable.	The hierarchy of sources (with the date) for toxicity values has been added to the PCCL. All other questions about sources for a specific parameter or value, or related information, can be addressed to and will be answered by CS program staff.	**Y**
84.	The EPA's 2011 Exposure Factors Handbook could be used to estimate more realistic body weights for the various age classes in the mutagenic risk equation. Assuming that children in the 0-2 age class have an average weight of 15 kilograms is unnecessary (same as with some other age class weight assumptions). Representativeness of all exposure factors should be reviewed.	The average weight is used for simplicity and reflects the EPA RSL equation and handbook data. The data is a weighted average from the exposure factor handbook with 0-2 yrs at 11.4 kg, 2-3 yrs at 13.8 kg and 3-6 yrs at 18.6 kg from Table 8-1. The resulting weight is rounded to 15 kg.	**N**
85.	Some discussions included in the document appear to be incomplete. For example, the Introduction section (pg. 2) indicates that an age-adjusted approach is used for the soil ingestion exposure pathway. This approach should also be used to calculate cleanup levels for carcinogens based on other exposure pathways and media. It is assumed that such discussion was simply omitted from the document and that this process is followed, but the document should include a more complete discussion.	The introduction section provides a brief discussion on the reasoning for adjustment to soil exposure for children and adults. However intake for water should also be included. The section was rewritten for more clarity for intake rates for child and adult but detail discussion was not provided as the intention is to provide how numbers are calculated and not a detail discussion of all the parameters. A sentence will be added directing one to the equations for what parameters were used for carcinogenic and noncarcinogenic.	**Y**

	Section 1-The Introduction section (pg. 2) indicates that an age-adjusted approach is used for the soil ingestion exposure pathway. It should also be stated that age-adjusted exposure factors are also used to calculate cleanup levels for carcinogens based on other exposure pathways and media (e.g., groundwater ingestion) as shown by the equations in Sections 2 and 3.		
86.	Section 5.1- The model given in this section assumes an infinite mass of chemicals in soil. VFs based on this model may violate the principle of conservation of mass (there may be insufficient mass to achieve the modeled VF over the assumed exposure duration). Many other regulatory agencies include finite source models to check whether conservation of mass is violated. Please include appropriate finite source models (see ODEQ 2003, Risk-Based Decision Making for the Remediation of Petroleum Contaminated Sites, September 22; Interstate Technology Regulatory Council (ITRC) guidance, http://www.itrcweb.org/risk-3/; etc.).	Method 2 is designed to be conservative to ensure protectiveness across a broad range of site conditions. Site-specific data may be used to develop a site-specific cleanup value if the responsible party deems that to be more representative. If the responsible party has a reliable estimation of the contaminant mass at the site, the department will consider a proposal under Method Three.	**N**
87.	Section 5.1- Default dermal absorption values for water exposures are reported to come from EPA's 2004 Supplemental Guidance for Dermal Risk Assessment. In Appendix B of this EPA guidance document, chemicals with physical properties that fall outside the predictive domain of the model used to estimate dermal absorption are identified. Please remove the dermal absorption values that are outside the model's predictive domain from Table 6 because quantification of health risks using these values is highly uncertain (see Appendix B of EPA's 2004 Supplemental Guidance for Dermal Risk Assessment).	The calculations did not include values outside of the model's predictive domain. To clarify this, the Kp values outside the predictive domain have been removed from the Table 6 of the PCCL.	**Y**
88.	For much of the public comment period, the information presented in Appendix A, Table 6 was not fully legible as the parameters appearing on the right side of the table were cropped. ADEC recently corrected this presentation error on December 4, 2015 after Question #52 was submitted on December 1, 2015. Prior to December 4, 2015, reviewers could not review the table in its entirety. ADEC should extend the public review and comment period to ensure that the public has a meaningful chance to review and comment.	Although the truncated columns had a minimal impact on the calculation of cleanup levels, this document, along with the other proposed changes in this regulations package, is being issued for a second round of public comment in May 2016.	**N**

89.	As noted below, there are discrepancies between certain default parameters that are listed for estimation of the volatilization factor for soil in Section 6.4 compared to the parameters presented in Appendix B Table 7 of the Procedures for Calculating Cleanup Levels, which ADEC proposes to adopt as a regulation. The table below outlines errors and discrepancies that require correction by ADEC.	Q/C Section 6.4 corrected to 101.5958 Basis for A, B, and C added to Table 8 used to calculate Q/C. T in Section 6.4 corrected to 8.2×10^8 n in Section 6.4 corrected to 0.43 θ_w Table 8 corrected to 0.15 θ_a Section 6.4 and Table 8 corrected to 0.28 F_{oc} definition corrected to 0.1% in Table 8	**Y**

Parameter	**Arctic Zone Soil Value in Section 6.4**	**Arctic Zone Soil Value in Appendix B Table 7**
Q/C (inverse of mean conc. at the center of a 0.5 acre square source)	100.13	101.5958
A (Dispersion Constant)	Not defined	7.144 (undefined basis)
B (Dispersion Constant)		31.1784 (undefined basis)
C (Dispersion Constant)		382.6078 (undefined basis)
T (exposure interval)	9.5×10^8	8.2×10^8
n (total soil porosity) calculated as 1- (ϱ_b/ ϱ_s)	0.434	0.43
θw (water filled soil porosity)	0.15	0.3
θa (air filled soil porosity) Calculated as n- θw	0.284	0.42 (this value is in error and

	Foc (organic carbon content of soil) 0.001 (defined in text as 0.1%) should be 0.133)[1] 0.001 (defined in table as 1%)		
90.	An incorrect averaging time term for a resident (ATress) is listed in the equations in Section 3.1. The correct averaging time term is ATressc.	ATress typo has been corrected to ATressc	**Y**
91.	The averaging time for an adult resident (AT_{ressa} or 9490 days) as defined in Appendix B Table 7 is incorrect. The correct value for AT_{ressa} is 7330 days (ED of 20 years x 365 days per year).	Definition of AT_{ressa} corrected 365 x ED_{ress}	**Y**
92.	Three dispersion constants (A, B, and C) were used to estimate the Q/C term (inverse of the mean concentration at the center of a 0.5-acre-square source), which was then used to estimate zone-specific PEFs and chemical and zone-specific VFs. Three different constants are defined for each of the dispersion factors in Appendix B Table 7 depending upon the soil zone, citing EPA 2002 as the source but with no other explanation. The rationale for selecting dispersion constants associated with three disparate locations to represent climate conditions in Alaska is not described anywhere in the Department's documentation. We recommend that ADEC revise its Procedures for Calculating Cleanup Levels to explain the rationale for the use of these dispersion coefficients and to afford the commenting parties a more meaningful opportunity to comment on this aspect of the guidance.	The dispersion constants along with a number of other Alaska-specific parameters were determined by Harding Lawson and Associates when the cleanup level zones (arctic, under 40 inch, and over 40 inch) were originally created and promulgated. The dispersion constants have been used consistently to calculate cleanup levels in every preceding cleanup level update. The Harding Lawson study has been added to Table 8 and to the list of references in the PCCL.	**Y**
93.	The proposed regulations at 18 AAC 75 give soil and groundwater cleanup levels for both 1,1,2,2- and 1,1,1,2-tetrachloroethane. However, this document only lists 1,1,2,2-tetrachloroethane and not 1,1,1,2-tetrachloroethane.	The Appendix has been revised to include parameters for 1,1,1,2-tetrachloroethane.	**Y**
94.	The Procedures for Calculating Cleanup Levels document needs to acknowledge that the migration to groundwater calculations are not correct when the contaminant is in the saturated or seasonally zone.	Method 2 is intended to be a streamlined, conservative approach which assigns a cleanup level to a large precipitation zone. Responsible parties have the opportunity to propose cleanup levels under Method 3.	**N**
Procedures for Calculating Cumulative Risk			
95.	Vinyl chloride is mentioned in Section 1.2 as having a unique set of risk equations. Trichloroethene (TCE) also has a	Text has been revised to reflect this.	**Y**

	unique set of equations that should be used to calculate mutagenic cancer risks for TCE. This should also be discussed in this section.		
96.	ADEC states that a cumulative risk assessment be performed using the single maximum groundwater concentration of a constituent. EPA recently issued guidance for CERCLA and RCRA sites directing that groundwater EPCs be based on the 95% UCL of the mean concentration among the highest detected concentrations in recent groundwater samples collected from a minimum of three monitoring wells within the same aquifer or plume. (EPA. 2014. Determining Groundwater Exposure Point Concentrations, Supplemental Guidance. OSWER Directive 9293.1-42. March 11.) ADEC should not depart from EPA guidance for the development of groundwater EPCs for the purposes of its approach to cumulative risk assessment. ADEC addresses this issue in its response to Question #50 and states that: "DEC currently accepts and will continue to accept EPA's ProUCL software as an appropriate statistical method." Arcadis recommends that ADEC clarify Section 2.2.3 by revising bullet (d) to add the word "groundwater" as follows: "maximum groundwater concentration or the mean soil concentration at the 95th percent upper confidence limit (UCL) remaining on-site following cleanup" and remove footnote #2, which states: "To employ the mean soil concentration at the 95% UCL under 18 AAC 75.380(c)(1), the department must approve an appropriate statistical method." From its answer to Question #50, it appears that ADEC does not require approval of a "statistical method." The document requires determining "the maximum concentration or the mean soil concentration at the 95th percent upper confidence limit (UCL)." Thus depending on the sample size and shape of the distribution, the sample maximum will not necessary provide coverage of the population mean. The sample maximum is not necessarily a "conservative" estimate of the population mean; it is not comparable to a 95% UCL of the mean. In fact, the sample maximum will likely underestimate the population mean when the sample size is small and the distribution is positively skewed. ADEC should require exposure point concentrations	18 AAC 75.380 (c) (2) requires the maximum groundwater concentration be used for compliance. ADEC is aware of the EPA guidance but has more stringent requirement in the cited regulation. While ProUCL is an accepted program for use in calculating upper mean, approval is still required as noted in the regulation. In some cases the maximum concentration is still used due to distribution or an insufficient data set.	**N**

	to be based on the 95% UCLs of the population mean unless a technical rationale to do otherwise is presented (e.g., the data set consists of non-detects)		
97.	In Section 2, COPCs are introduced in the second list item. It is unclear whether the term COPCs is meant to refer to chemicals with concentrations greater than one tenth of the cleanup level, as discussed in the first list item, or if a different meaning is intended here. The term COPCs as applicable to this document should be further defined.	Agreed. This has been clarified.	**Y**
98.	Section 5.2 discusses the WHO as the leading recommended source of TEFs for dioxin like compounds and refers to Appendix C. However, this is not discussed in Appendix C; this discussion should be added to the appendix. Other specific sources of toxicity information should also be discussed.	The reference to the appendix is removed as it is not a typical assessment on toxicity but an approach for using a surrogate. Details can be obtained from the cited document.	**Y**
99.	Section 5.4 discusses chemicals not found in ADEC tables. The recommendation is to consult the RSL table, but additional recommendation is not provided for chemicals not found in the RSL table. The procedure for evaluating such chemicals should also be described in this section.	Additional language is added to consult with risk assessment staff in the event no chemical is listed in either tables.	**Y**
100.	Section 2.2.2 -The term Chemicals of Potential Concern (COPC) is introduced in "Procedures" (Section 2.2.2). It appears that a COPC is meant to refer to a chemical with a concentration greater than one-tenth of its cleanup level. The term COPC, as applicable to this document, should be better defined, preferably in Section 2.2.1.	Agreed. This will be clarified.	**Y**
101.	ADEC states in Section 1.3 that the Hazard Index (HI) can only be segregated by target organ despite the fact that ADEC states in that same section that "[t]o accurately assess the possible effects of noncarcinogenic compounds, the HI can be segregated by target organ or system endpoint and mechanism of toxicity consistent with EPA's Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part A) – Interim Final (USEPA, 1989), Guidelines for the Health Risk Assessment of Chemical Mixtures (USEPA, 1986), and Supplemental Guidance for Conducting Health Risk Assessment of Chemical Mixtures (USEPA, 2000)." Moreover, ADEC further states in Section 2.5 that "[t]he hazard index (HI) is the summation of all HQs across all pathways that are affecting the same target organ or system endpoint." The	For consistency with the RAPM the language has been clarified, "since the mechanism of toxicity is not well understood for many compounds, the department will evaluate segregation of the HI by target organ or system endpoint."	**Y**

	document should clarify that the HI can be segregated by organ or organ system as stated in Section 2.5.		
102.	Heart, lung, and spleen are organs, and chemicals for which the sensitive endpoints are based on heart, lung and spleen can be grouped. However, some chemicals have RfDs that are based on different aspects of an organ system, such as the immune system. The organs of the immune system include the thymus, bone marrow, spleen, lymph nodes, and others. An adverse effect on the immune system can be noted by effects on these organs or also on effects that result from organ damage, like modifications to the numbers of circulating lymphocytes or decrease in number of antibody forming cells against sheep red blood cells in male mice. Similarly, chemicals can adversely affect the nervous system and manifest the damage in different ways. RfDs based on adverse effects of the central nervous system, peripheral nervous system, brain, myelin, or specific nerve cells should be considered an organ group for endpoint-specific HI calculation. Another example is the reproductive organ system groupings. Some RfDs are based on "reproductive toxicity," changes in sperm count or sperm motility, or adverse effects in the testes. These chemicals should all be grouped to derive a HI for male reproductive effects. Accordingly, ADEC should clarify effects to organ system groupings are consistent with USEPA guidance as cited. ADEC addresses this issue in its response to Questions #46 and #47, by stating: "In a method four risk assessment, segregation of hazard indices is allowed. See the 2015 Risk Assessment Procedures Manual on our technical guidance page for details." Arcadis agrees that the Risk Assessment Procedures Manual allows for segregation of hazard indices by target organ or system endpoint. Arcadis recommends that ADEC revise Section 1.3 of Procedures for Calculating Cumulative Risk to delete the last sentence in Section 1.3, which reads "Since the mechanism of toxicity is not well understood for many compounds, the department will evaluate segregation of the HI by target organ alone." This statement is inconsistent with the Risk Assessment Procedures Manual.	For consistency with the RAPM the language has been clarified, "since the mechanism of toxicity is not well understood for many compounds, the department will evaluate segregation of the HI by target organ or system endpoint."	**Y**

103.	ADEC has proposed language to allow a responsible party to avoid a cumulative risk assessment under certain circumstances: "The cumulative risk standard must be met upon completion of site cleanup work, but contaminant levels established during a thorough site characterization effort may be sufficient to rule out a cumulative risk, with ADEC approval." However, ADEC offers no threshold criteria or standard by which a responsible person may propose and justify, or ADEC decide, that a cumulative risk analysis is not necessary. We recommend that ADEC provide criteria for identifying the circumstances in which a cumulative risk assessment is not needed. ADEC addresses this issue in its response to Question #48, but the response is inconsistent with the proposed language, which states: "...contaminant levels established during a thorough site characterization effort may be sufficient to rule out a cumulative risk, with ADEC approval."	Cumulative risk is a calculation (not a risk assessment) and it can be calculated by the CS project manager or the consultant, or both, as soon as after site characterization if the data is found to be adequately representative of the site. If the cumulative risk calculation is done on those concentrations and cumulative risk is met, then it doesn't have to be done again, unless new data indicates that it may be exceeded. In any event, calculating cumulative risk always has to be done at some point for a site. The text will be revised to state that if adequate data is available following site characterization, the cumulative risk may be calculated at that time.	**Y**
104.	The following statement at Section 2.2.3 is incorrect: "The RBCs differ from Table B1 and Table C in that individual exposure pathways are shown rather than the most protective value of all the pathways as listed in the Tables." They are, in fact, the composite human health values that include all three exposure pathways (ingestion, dermal and inhalation). For each compound, the RBC represents the more protective of the carcinogenic composite RBC and the noncarcinogenic composite RBC.	The sentence in section 2.3 has been clarified to state, "The RBCs differ from Table B1 and Table C in that individual exposure pathways are shown rather than the cumulative risk from the respective media listed in the Tables."	**Y**
105.	The proposed regulations at 18 AAC 75 give soil and groundwater cleanup levels for both 1,1,2,2- and 1,1,1,2-tetrachloroethane, as does the online calculator. However, this document only lists 1,1,2,2-tetrachloroethane and not 1,1,1,2-tetrachloroethane.	1,1,1,2-tetrachloroethane will be added.	**Y**
106.	The proposed regulations at 18 AAC 75 give soil and groundwater cleanup levels for tri-n-butyl tin hydride (CAS# 688-73-3), as do the Procedures for Calculating Cleanup Levels, dated July 15, 2015, and the online calculator. However, the Procedures for Calculating Cumulative Risk, dated July 15, 2015, also presents human health risk based concentrations for soil for tri-n-butyl tin chloride (CAS# 56573-85-4). These human health risk based concentrations are based on carcinogenic effects, but this chemical is not classified as carcinogenic by EPA. The only toxicity factor	The commenter is saying tri-n-butyl tin chloride (CAS# 56573-85-4), but the table in the PCCR actually says "tributyltin" (CAS#56573-85-4). This entry was erroneously included in the PCCR and has been deleted.	**Y**

	listed in the online calculator and Procedures for Calculating Cleanup Levels is a noncarcinogenic Reference Dose. EPA does not list any carcinogenic slope factor for either tributyltin compounds or tri-n-butyl tin hydride (CAS# 688-73-3). It is recommended that ADEC remove all reference to tri-n-butyl tin chloride (CAS# 56573-85-4) in Procedures for Calculating Cumulative Risk.		
107.	The cumulative risk document appears to require the use of the RBCs presented in Appendix B, however, the inhalation RBCs presented in Appendix B for the organic compounds are not correct for most sites because the inhalation RBCs for soils do not account for 4-phase partitioning with Raoult's Law.	The 4-phase partitioning with Raoult's Law is not being proposed in setting the default method two cleanup values in Table B1. A 4-phase approach may be proposed on a site specific basis under Methods 3 or 4.	**N**
108.	The first paragraph of Section 3.0 says "*Unless it is shown that the groundwater at the site is not used or could not potentially be used for human consumption,* ***it should be assumed that these groundwater pathways are complete***". The text should be edited to differentiate between sites where the groundwater pathway is currently complete, versus sites where the groundwater pathway is potentially complete in the future. The revised text needs to clarify that site closure, IC requirements and potentially the need for remedial action will be based on the assumption that the pathway is complete, but the short term risk communication, short term risk management and potentially rapid response should be based on whether the pathway is currently complete. This is consistent with the CSM guidance	The PCCR document is not intended to discuss the details associated with pathways, site closure, IC requirement or risk communication.	**N**

Second Public Comment Period
Comments and Responses
August 24, 2016
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No.	Comment	ADEC Response	Changes Made? (y/n)
	General Comments		
1.	Updating regulatory language with new scientific information about cleanup levels is pertinent for both human and environmental health. All subsequent changes, such as updating and clarifying language, and updating adopted reference procedures, are necessary for consistency of the Oil and Other Hazardous Substances Pollution Control regulatory document. BBNA supports the proposed modifications as it is our concern to protect Native peoples' health and environment which sustains our peoples' way of life.	Thank you for your comment.	N
2.	ADEC has failed to supply significant information to support the positions stated in the proposed regulatory and procedural amendments. Failure to provide such information puts the proposed revisions at risk of challenge if ADEC does not take time to properly promulgate this rule.	The commenter has not provided specifics as to what information and what positions are being referred to, therefore the department cannot respond with any specific information to address the comment. However, the department has taken more than a year, two public comment periods, and four public workshops to proceed through the regulatory process and to consider public input. The department posted a number of supporting documents and other resources and addressed approximately 50 questions submitted by the public. The department has made the changes to the regulations based on sound and vetted science as well as public input received during this process.	N
3.	DOD thanks DEC for adequately addressing or incorporating comments #3, 8, 12, 28, 45, 57, 58, 64, and 74.	Thank you for your comment.	N
4.	The Department of Defense (DoD) welcomes the use of risk-based cleanup goals in our cleanup program as it is consistent with the Defense Environmental Restoration Program (DERP) objectives for cost-effective cleanup that is protective of human health and the environment. The DERP conducts environmental restoration activities in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the National Contingency Plan (NCP) and Executive Order 12580 regarding lead agent authority. Please note that state environmental laws such as 18 AAC 75 and proposed revisions apply only as provided by CERCLA and judicial interpretations thereof. CERCLA 42 USC § 9620(a)(1) and 42 USC § 9621(d)(2) limit the role of state laws on federal facilities to the applicable or relevant and appropriate requirements (ARARs).	The Department acknowledges the applicability of ARARs in the CERCLA cleanup process. However, the department cannot comment on limitations, if any, which may be imposed by judicial interpretations that may be related to site-specific circumstances. Also the Department disagrees with the stated limitations on state laws at federal facilities as stated in the comment.	N

	DoD review of ADEC response (#20): This comment was dismissed or incompletely addressed, DoD feels our original comment is valid and re-submits the comment. DoD requests reevaluation of the comment as the response did not convey that ADEC acknowledges the applicability of ARARs in the CERCLA cleanup process and the limitations thereof.		
5.	The proposed regulations will result in substantial changes to cleanup objectives that will likely result in the re-opening of numerous closed sites and require extensive revisions to work plans and implementation of land use controls which will increase cleanup times and long-term costs with questionable environmental or health benefits. Additionally, there is considerable uncertainty and variability as to how and when site evaluation under the proposed regulation changes will be implemented. The implementation of the proposed rules as written will likely result in protracted debate and delay of remedial actions at DoD sites without achieving increased health protection. As such, a comprehensive and focused evaluation of the impacts, costs, and implementation challenges of the proposed regulations is recommended. DoD comment on ADEC response (#52): The response addresses a similar but different comment and thus only indirectly addresses our original comment. While DoD appreciates ADEC understanding the concern with re-opening closed sites, the DoD feels our original comment is valid and re-submits the comment for consideration. A comprehensive and focused evaluation of the impacts, costs, and implementation challenges of the proposed regulations is recommended.	The Department understands the concerns of the commenter. The Department will be taking a careful and measured approach to evaluating closed sites where additional action may be required, such as imposing additional institutional controls, conducting additional monitoring, or if necessary, re-opening the site, as outlined in the Department's original response to this comment.	N
6.	The Alaska Department of Environmental Conservation (ADEC) has proposed to revise several portions of regulation 18 AAC 75.325 that involve a general protectiveness standard. The DoD does not consider a general protectiveness standard to meet the definition of an ARAR, since a state requirement must be specific to the hazardous substance involved to constitute a level or standard of control. A state law stating that all cleanups must achieve a specified cumulative cancer risk level for all contaminants and pathways does not establish a chemical specific requirement, but rather is a generic protectiveness level. Also, even if it is stated that a state protectiveness requirement applies to all individual contaminants present, as 18 AAC 75.325 does, such a general	Comment noted; however, the Department does not agree that its cumulative risk standard of 1 X 10^{-5} is a general standard. It is a specific risk threshold that must be met at all sites. In addition, for each carcinogenic compound in tables B1 and C, the cleanup level is calculated at a risk standard of 1 X 10^{-5}. Therefore the application of the standard is consistent. Consuming contaminated groundwater that that is a result of a 100 different chemicals equal to a 10 gallon release should have the same standard as having 1 chemical that is equal to a 10 gallon release. The standard would be the carcinogenic and non-carcinogenic causing chemicals.	N

	standard is not specific to an individual chemical and therefore not considered a valid ARAR. This pertains solely to remedial actions conducted pursuant to CERCLA. It is noted that at DoD sites where remedial action is conducted pursuant to CERCLA, the proposed Soil and Groundwater Cleanup Levels for chemicals listed in the tables of 18 AAC 75 regulations, once promulgated by Alaska, will constitute valid ARARs as they are chemical specific levels/standards of control, but only if they provide a more stringent level of cleanup than federal standards. DoD comment on ADEC response (#73): This comment was not addressed since 18 AAC 75.325 is not proposed for revision, however the comment is referring to the inconsistency between the proposed revisions and section 75.325. A general protectiveness standard does not allow for consistent application of the requirements of section 75.325.		
7.	At federal facility sites, the cleanup levels of 18 AAC 75 are potential CERCLA ARARs. They do not, however, constitute a basis for action in a remedial investigation at federal facility sites. A basis for action for groundwater requires that a federal or state non-zero Maximum Contaminant Level Goal or Maximum Contaminant Level (MCL) is exceeded and there is a potential or actual exposure pathway; or ecological risk is determined unacceptable; or cumulative cancer risk exceeds one in ten thousand (10-4); or the non-cancer risk exceeds a hazard index (HI) of 1. Since 18 AAC 75 no longer uses MCLs, a DoD remedial action (following a Remedial Investigation) will generally only be triggered at federal facility sites when a federal or more stringent State MCL or non-zero MCL goal is exceeded, or a risk assessment finds that cumulative cancer risk exceeds 10-4, or a non-cancer HI exceeds 1. DoD comment on ADEC response (#38): DoD thanks ADEC for addressing the comment, however we feel that the response does not acknowledge the difference between an action level and a cleanup level as set by an ARAR and that the proposed rule should be further evaluated and clarified as to the comment above. See Specific Comment 6.	The Department does not differentiate between cleanup levels and action levels in its regulations. Under CERCLA, differentiation between an action level and a cleanup level may occur.	N
8.	It is appreciated that ADEC is cognizant of the resultant impact of re-opened sites and remobilization of field work and the potential cost impacts to a responsible party. Please evaluate the intended and unintended effects of the regulations on current and closed sites	The department will be conducting an evaluation of the impact if any of the updated regulations on closed sites, but until the proposed amendments are final, this effort cannot be completed.	N

	and provide more clarity as to how ADEC intends to implement these changes along the cleanup process. For example, remedial actions at ongoing remediation sites with approved work plans should be allowed to use the previous cleanup levels and/or previous methodology. DoD comment on ADEC response (#52): The response addresses a similar but different comment and thus only indirectly addresses our original comment. As with General Comment 2, an indirect response to the reopening of sites was provided (#52), however ongoing remediation with approved work plans was not addressed. The information provided thus far prohibits DoD from accurately planning and programing for further cleanups.	In regard to sites that are currently active under the site cleanup rules, implementation of the new regulations is likely to happen around the end of December 2016 or early 2017. This provides several months' notice of the changes. The Department would like to add that the DoD is not prohibited from conducting its own evaluation of the impact of the proposed changes on DoD cleanups.	
9.	The language of 18 AAC 75.340(d) was amended/clarified and includes the statement that "The cleanup level that applies at a site is the most stringent of either the site-specific calculated level or, for a pathway where no site-specific value was calculated, the listed value for a hazardous substance in Table B1 of 18 AAC 75.341(c) or Table B2 of 18 AAC 75.341(d)." If an approved site-specific alternate cleanup level is protective, it is not appropriate to still default to a more stringent value from table B1 or B2. This essentially limits the calculation of alternate cleanup levels to only those that are lower than the values in Tables B1 or B2. It appears that using site-specific conditions and input factors that result in a slightly higher, but still protective cleanup levels will still default to the Table B1 or B2 values. This stipulation unfairly eliminates the use of site-specific information and sound scientific data in making site cleanup decisions.	The commenter may have misunderstood the revised language. The text states that, for example, if a site-specific human health cleanup level is calculated, but it exceeds the listed migration to groundwater level, then the latter would apply unless the responsible party chose to also calculate a site-specific migration to groundwater level. Or vice versa, if a site-specific migration to groundwater level is calculated and it exceeds the listed human health level, then the latter would apply. This is the same approach currently in effect in the regulations, but reworded for brevity.	N
10.	We would also like to point out that although ADEC has not directly stated so, the proposed ADEC regulations would likely impact the use of the Method 3 Hydrocarbon Risk Calculator; and there would need to be updates in order to be consistent with the proposed ADEC regulations (revised toxicity criteria for petroleum constituents, age-adjusted exposure factors, etc.)	This is correct, and DEC is aware of this impact. The Hydrocarbon Risk Calculator is a third-party tool and it is up to the developer of the tool to update it. The department is in the process of developing its own 4-phase equilibrium partitioning tool.	N
11.	The proposed amendments and technical fixes in the May Comment Responsiveness Summary address risk assessment chemical cleanup level (CL) goals, whether default or site specific CLs, that are protective of human health such as 10-5 cancer risk. However, the fundamental flaw remains; there is no risk management guidance to ensure remediations do not increase risks. DEC/CSP does not deny that AS 46.09.020(a)(1), (2), & (3) requires risk management (safe, feasible, and no greater	The department disagrees with the comment. The commenter presents a flawed approach to risk assessment by conflating occupational risks associated with operating heavy equipment and vehicle transport with cancer and noncancer risks posed by exposures to contamination present in soil and groundwater at a site. Worker safety and risks from accidents are managed the purview of the Department of Labor and the Occupational Safety and Health Act, not	N

	environmental or health risks than without cleanup). The Risk Assessment Procedures Manual affirms this requirement; "This manual does not provide guidance on the risk management decisions that must be made by ADEC." By not providing risk management guidance, CSP avoids having to compare CL risks with actuarial risks of required remediations. CSP's risk assessments use the 99th+ percentile lowest limit for a CL which would result in a 1/100,000 chance of "adverse health effects" to an individual exposed for a lifetime, while risk management is based on the average harm (typically fatalities or serious injury based on huge national databases). An unbiased numerical comparison would reveal many required remedial actions greatly exceed risks of the no action alternative. Without uniform comparisons, CSP can pretend that remediation risks are small relative to chemical risks and therefore need not be considered. When questioned, the CSP cites protocol "DEC's mandate is to protect human health and the environment from releases of oil and hazardous substances. Worker safety and transport of hazardous substances are addressed by other State and Federal regulations."(DEC/CSP Response to Comments to 2007 Regulations). This is classic risk transfer with no written justification or documentation. Staff offered no source or explanation, only "you can always sue us." In the 6/8 public meeting, CSP staff denied they were required to do any risk management or have a policy for it or that they even did it. Standing policies of not requiring remediation of "natural" arsenic, crushed asphalt, or contamination under your house obviously are common sense risk management. The CSP apparently bases these policies on "political and social acceptability" rather than statutory risk reduction justification. Risk management allows additional tools not used to set CLs by CSP's methods 1-4, including empirical tests and statistical evidence. For instance, leach tests can empirically show if crushed asphalt or heavy oils in soil present a site migration to groundwater risk. The huge national database of asphalt studies may provide statistical information, as would four phase modeling. Site risk management can provide justification for leaving contamination under structures based on feasibility of remediation compared to probabilistic risk reduction. It will also more clearly	the Department of Environmental Conservation. Cleanup operations and activities at contaminated sites must also comply with worker safety rules. OSHA and AKOSH prescribe procedures for ensuring worker safety during cleanup operations, and reducing the risks and occurrence of accidents. Provided these rules and laws are properly complied with, the risks of accident and injury are safely managed during cleanup operations.	

	and accurately describe the remaining health risks and justify the institutional controls. I strongly urge a stay of these amendments until CSP produces a Risk Management Procedures Manual to enable them to knowledgably make required risk management decisions. This guidance should also include examples of soil concentrations of arsenic, crushed asphalt, or contamination impacting structures that require remediation vs those that don't. Where site remediation is required, the guidance should demonstrate how to calculate and show reduction in chemical risks will reasonably exceed the increase in risks caused by the remediation.		
12.	This is the fourth set of proposed changes to the contaminated site regulations in the last year. I am concerned that responsible parties, environmental professionals, and the public will lose track of the regulation change packages and not provide comments when there are significant issues that affect them (i.e. multiple regulation change packages, closely spaced in time will tend to suppress comments). Also I am concerned that by going through multiple, incremental changes to the regulations, there may be cumulative effects which do not become clear until after several regulation changes have been made. I think it would be better to have fewer regulation change packages and make the packages a more complete update of the regulations. For example, changes to the Risk Assessment Procedures Manual (cumulative risk for the hydrocarbon fractions) may become significant due to changes later proposed for the Procedures for Calculating Cleanup Levels document (use of the Andelman volatilization factor).	Multiple smaller regulations projects spaced over time are easier for the public to review and provide comment. The department is cognizant of how changes to a section may influence other areas of the regulations not proposed for revisions. Additional amendments will be proposed in the future to address such impacts.	N
Cost of Complying with the Regulations			
13.	It is understandable that these changes are meant to help protect overall health in light of new information. BBNA's concern is the impact that the proposed modifications may have on previous assessments and cleanup activities that were completed using current regulatory language. Securing assessments and cleanup services, especially in rural Alaska and the Bristol Bay region, is very expensive. With the proposed modifications, there is a question on whether or not past efforts need to be revisited. More clarification is needed on how these proposed changes to cleanup level for soil and groundwater will impact previous completed assessments and cleanup work as we move forward. Language in the proposed modification document did not address this concern. Related, an	The department respects the concern raised by the commenter; unfortunately, costs for environmental work varied widely around the state and responsible parties do not volunteer cost information about environmental cleanup work to the state, nor are they required to do so. Without this information from responsible parties, and for a wide range of sites across the state, it is not possible to assess the costs under one set of cleanup levels versus those under a proposed set of cleanup levels, with any degree of accuracy. In the future, the department may invite responsible parties to volunteer such information.	N

	example cost analysis of the proposed modifications would be helpful for the public to understand how the new language could have affected costs for previous projects, or potential future projects.		
14.	There is not a significant assessment of the impact of the proposed regulation changes. The response provided in the Comment Responsiveness Summary to 18 AAC 75 (May 17, 2016) is also insufficient, which says in part "the department is not provided information about the costs incurred by responsible parties in their cleanup of contaminated sites". In general, I think the ADEC should try to understand the costs of their investigation and remediation requests at all times, and for an effort such as costing the impact of the proposed regulation changes, I am confident that the regulated community and consultants could provide information and help with the analysis.	The department respects the concern raised by the commenter; unfortunately, costs for environmental work varied widely around the state and responsible parties do not volunteer cost information about environmental cleanup work to the state, nor are they required to do so. Without this information from responsible parties, and for a wide range of sites across the state, it is not possible to do an assessment of the costs under one set of cleanup levels versus those under a proposed set of cleanup levels, with any degree of accuracy. In the future, the department may invite responsible parties to volunteer such information. The department does routinely consider costs on a site-specific basis when working with responsible parties to evaluate alternatives for cleanup actions and other steps in the cleanup process.	N
15.	ADEC's proposed changes to the regulations appear to have been made without consideration of costs, which will be significant for regulated parties and for FHRA specifically. AS 46.03.024 provides that, when Alaska adopts a regulation concerning "the control, prevention, and abatement of air, water, or land or subsurface land pollution, the department shall give special attention to public comments concerning the cost of compliance with the regulation and to alternate practical methods of complying with the statute being interpreted or implemented by the regulation." See also AS 44.62.190(d) ("Along with a notice [of proposed action], the state agency . . . shall include . . . the initial cost to the state agency of implementation [and] the estimated annual costs . . . to private persons to comply with the proposed action; the state agency for implementation and to other state agencies to comply with the proposed action; and municipalities to comply with the proposed action . . . ."), and AS 44.62.210(a) ("[T]he agency shall pay special attention to the cost to private persons of the proposed regulatory action.").	The department's analysis of costs has met the legal requirements of the statutes cited by the commenter. The department respects the concern raised by the commenter; unfortunately, costs for environmental work varied widely around the state and responsible parties do not volunteer cost information about environmental cleanup work to the state, nor are they required to do so. Without this information from responsible parties, and for a wide range of sites across the state, it is not possible to do an assessment of the costs under one set of cleanup levels versus those under a proposed set of cleanup levels, with any degree of accuracy. In the future, the department may invite responsible parties to volunteer such information. The department does routinely consider costs on a site-specific basis when working with responsible parties to evaluate alternatives for cleanup actions and other steps in the cleanup process.	N
16.	ADEC proposes to set groundwater cleanup standards for many constituents below levels EPA has found safe for people to drinking without any scientific or technical explanation why ADEC rejects EPA's expert views in the area of safe drinking water. Such low levels are not only expensive to achieve, but in many cases may be technically impracticable. Cost will not only be incurred by parties found responsible to study and address constituents in water	The drinking water Maximum Contaminant Levels (MCLs) are federal public drinking water standard that take into consideration cost and technology. EPA also sets MCL goals at zero if for chemicals that are carcinogens. EPA allows for states to adopt more stringent standards, which many state have done due to more current and updated information; whereas, MCLs are not routinely updated. If a chemical is nominated for an update of the MCL, it is a six-year process (See the	N

	at such low levels, but will expend a great deal of ADEC time and money as well. Imposing such low cleanup standards without a full analysis of the cost impact flies in the face of the mandates from the controlling Alaska statutes cited above.	attached "Regulation Timeline: Contaminants Regulated Under the Safe Drinking Water Act"). As a result of this process and the varied approaches for how MCLs are derived, the department has selected a single consistent approach for setting groundwater cleanup levels for all 182 compounds it lists in Table C. The approach is based on the latest information available as of 2016 about exposure and toxicity. Deferring to the MCL for the 52 compounds for which MCLs are available, would result in an inconsistent approach that is not uniformly risk-based. As described by the Department in its cost analysis for the proposed amendments, lower cleanup levels for contaminants may increase costs for some sites due to additional monitoring events and longer operation of remediation or water treatment systems. However, health costs associated consumption of contaminated groundwater are avoided (saved) which reduces the overall cost impact of the proposed changes. Furthermore, options, such as institutional controls restricting groundwater use, are available to hasten the redevelopment of a contaminated property while still protecting the public. The Department is limited to a general analysis of the potential costs and savings of the proposed changes, as information on specific costs that may be incurred by responsible parties is not available.	
17.	ADEC's proposal that when "the department determines that toxicity data is [sic] insufficient to establish a cleanup level for a hazardous substance or a pollutant… The department may require a responsible person to provide an alternative source of drinking water to the affected parties... "Again, ADEC ignores the costs such delay can impose on the community and regulated parties. FHRA has firsthand experience of this at the North Pole site where ADEC has delayed determination of a final cleanup number for sulfolane for several years, and will delay that determination for several more, even though it currently has sufficient data to set a cleanup number. This delay places the community in a continual state of uncertainty while FHRA incurs the cost of supplying alternative water to many people who have not been exposed to unsafe levels in their drinking water. FHRA estimates that the costs associated with the remediation of the North Pole Refinery site and the provision of drinking water wastes millions of dollars per year as a direct result ADEC's continuing and unwarranted delay in setting an appropriate cleanup level for sulfolane in groundwater. Despite the clear impact	The department does not deny that there are costs to providing an alternative drinking water source where insufficient toxicity information is available on a contaminant. However, recipients of a safe source of drinking water may benefit from avoided health care costs that might result from consumption of groundwater contaminated with a compound that may be found to have long term health effects.	N

	of the proposed regulatory revisions, ADEC makes no attempt to consider the economic impacts of the proposed changes on the businesses, communities, and people in the State of Alaska.		
	18 AAC 75.325 (g) and (h)		
18.	325(g)……The words "*Instructions for determining*" cumulative risk have been inserted into 325(g) (but not into 325(H)). I assume this change is intended require that cumulative risk be calculated essentially, exactly as shown in the cumulative risk document – is this an accurate characterization of ADEC's intent? Note that the cumulative risk document is technically in error (e.g. the outdoor inhalation RBCs are in error when NAPL is present). Changes to the cumulative risk document need to be made and the regulations don't need to require that the cumulative risk calculation is performed as shown in the cumulative risk document. What was the problem with the old wording of the regulation?	The added wording removed the word "guidance" to conform with the change in the document's title from a guidance document to a procedures document. Documents which are adopted by reference have the force of regulations and are therefore not considered optional. A conforming change has been made to 18 AAC 325(h) to replace "Guidance on" with "Instructions for".	Y
	18 AAC 75.340 Soil Cleanup Levels; General Requirements		
19.	Regarding draft changes to 18 AAC 75.340(a) -- By including a reference to Tables B1 and B2 in this section, it appears to preclude the use on Method 1 Soil Cleanup levels for the non-Arctic (Table A1) and the Arctic (Table A2). Method 1 soil cleanup levels were developed by ADEC to be conservative. Referencing Method 2 data tables would cause additional effort and cost to the site owner to ensure compliance with Tables B1 and B2. ADEC appears to be taking away the Method 1 Soil cleanup level option for Arctic and non-Arctic sites. Suggest eliminating this change.	DEC thanks the commenter for pointing out this unintended error. The proposed language will be removed to preserve the use of Method 1 Soil Cleanup levels for the non-Arctic (Table A1) and the Arctic (Table A2).	Y
20.	18 AAC 340(a) -I don't see a need for the change. What is the purpose of the change? What is the benefit of making the change? What was the problem with the old text?	The change in this subsection was made to clarify how terms are referred to in subsequent subsections. However, the proposed language will be removed.	Y
	18 AAC 75.345 Groundwater Cleanup Levels		
21.	The language of Section 18 AAC 75.345(d) would require actions to be taken when there is no ARAR and a potentially unacceptable risk has not (and cannot) be demonstrated. Furthermore, the only "exit strategy" for providing alternate drinking water could potentially either take years to be developed or may never be agreed to, so the state is essentially requesting that alternate drinking water be provided in perpetuity when no risk has been demonstrated. This type of action and resultant expenditure without an ARAR or a potential risk is not consistent with CERCLA and should be revised. DoD comment on ADEC response (#21): Dismissed or not addressed, DoD feels our original comment is valid and re-	In instances where the toxicity of a pollutant in groundwater is not known or completely known, the department is authorized by statute to establish rules to abate this pollution. Pollution is defined as that which makes waters, land or subsurface land "actually or *potentially* harmful..." (emphasis added) See for example AS 46.03.020(10) and AS 46.04.900(20).	N

	submits the comment. DoD requests re-evaluation of the comment as the proposed language for Section 18 AAC 75.345(d) pertains to situations where the department has not developed a cleanup standard and health, safety and welfare and environment data is not demonstrated but remains only speculative. The agency's response is inconsistent with the statutes it cites for its authority. The agency must first establish the risk, then require a responsible person to provide an alternative water source. The DOD is not authorized to spend funds to provide alternative drinking water under either the DERP or CERCLA without showing either an unacceptable risk or imminent and substantial danger to human health. Further, under the NCP, remedial actions must comply with ARARs- the proposed language does not establish an ARAR.		
22.	18 AAC 75.345(b)(4) violates the Administrative Procedures Act ("APA") and, as a consequence, should be stricken. This subsection of the regulation would allow ADEC to use the risk assessment process to establish a site-specific cleanup level for a hazardous substance not listed in 75.345(b)(l). If ADEC desires to establish a cleanup standard itself, its option is to propose a standard and invite the public to provide input on the standard under the APA. Here, ADEC is proposing to short circuit the process by giving itself a mean to establish a legally-binding standard outside of the AP A. The fact that the regulation itself is promulgated under the APA does not cure the defect; the key question is whether the standard itself has been developed under the APA.	The department routinely establishes standards for contaminants not listed under 18 AAC 75.345 at the request of other agencies, responsible parties, and for its own purposes. This regulation change defines the process that will be used for developing such standards. That process is the same as would be used by a responsible party calculating a cleanup level for a contaminant not listed. Since the process has been through the public review and comment process, and is adopted in regulation, there is no violation of the APA as asserted by the commenter.	N
23.	Concerning ADEC's response to comment #39: the response neither responds to Arcadis' earlier comments nor does it provide any scientific basis for uniformly applying chronic toxicity factors that assume that children are typically 100-fold more sensitive than adults to noncarcinogenic chemicals nor does it provide the scientific rationale underpinning the requirement that groundwater be cleaned up to levels lower than the levels deemed safe by USEPA for potable drinking water from public water systems. Thus, Arcadis' initial comments apply with equal force to the May rule and are accordingly offered again.	ADEC stands by the process on the calculated values. Following is the department's scientific rationale for setting levels protective of children, rather than deferring to outdated MCLs that take into account cost and technical feasibility and ignore certain exposure routes. The commenter's concern about the lower values focus on two main issues. 1) <u>Exposure parameters to the receptor.</u> Children are inherently smaller so chemical body burden is higher. The best way to illustrate this is the following example: An individual weighing 70 pounds given the same volume of alcohol as another individual weighing 200 pounds will be more affected than the second individual. 2) <u>Application of chronic toxicity exposure factors for child receptor.</u> The values are intended to protect residential receptors, thus couples who reside in a location and start a family from pregnancy are not	N

		spontaneously moving their children at age 6 to stop the exposure from the groundwater. The EPA definition of chronic exposure is not a fine line at 6 years and would be under the assumption the exposure has stopped at 6 yrs. The definition on the timeframe for the chronic exposure does vary as the Agency for Toxic Substances and Disease Registry defines chronic exposure as more than 1 year and a more generic term is define by medical dictionary of "extended period" or "long term." Since it cannot be assumed that all or even a majority of residents relocate after a 6 year interval specifically to stop exposure and the absence of a consensus definition for chronic exposure as a finite period of 6 years, ADEC stands behind the use of chronic exposure for the development of the residential children receptor. In addition, ADEC is using the same process (including chronic toxicity and child exposure parameters) to develop values for soil as was used in the 2008 update of the cleanup levels.	
24.	Concerning ADEC's response to Comment #19: The response to the comment is scientifically incorrect. ADEC has stated that not every RfD takes into account sensitive subpopulations. This is an incorrect statement. Every RfD is derived using an Uncertainty Factor for sensitive individuals in the population unless the study was performed on the most sensitive subpopulation. These factors were designed by USEPA specifically to address the concern that infants, young children, pregnant women, the elderly, and other sensitive subpopulations may be more susceptible to exposure to chemicals than an average adult. Arcadis evaluated all 474 RfDs and Reference Concentrations (RfCs) on USEPA's Integrated Risk Information System (IRIS) database and found that 468 out of 474 had intraspecies Uncertainty Factors. Only six out of 474 used an intraspecies Uncertainty Factor of 1 and in all six of these cases, USEPA stated that the study was performed in the most sensitive human subpopulation (benzoic acid, beryllium, fluorine, manganese, nitrate, and nitrite). Arcadis repeats its initial comment here. If ADEC has any scientific papers demonstrating that individuals who were exposed to any chemical for a period of six years in groundwater were more than 100-fold more sensitive than an average member of the exposed population, it should make those papers and the supporting data available to the public as the rationale for this proposed language about "sensitive	There are two primary to answer when evaluating a site where a sensitive subpopulation may be present: 1) Are the default generic exposure assumptions used appropriate for the protection of the subpopulation which may include infants, subsistence residents, pregnant women, the elderly, or individuals with a history of chronic illness? For example, default exposure factors for commercial/industrial receptors under method 3 may not be protective of a daycare in a commercial industrial setting because the exposure parameters used may not be representative of the exposure to the children housed at the daycare facility. 2) Are there peer reviewed data to suggest protectiveness of the toxicity used for the subpopulation? ADEC acknowledge the fact that a default generic uncertainty factor is applied. ADEC's response was meant to acknowledge there is no actual clinical data study for all cases, thus only a "default uncertainty factor" is applied which may not be protective for the biological factor for the subpopulation. If the study actually contains sensitive human subpopulation data in the assessment there shouldn't be any	N

	subpopulations." Otherwise, the language should be stricken in its entirety. The language at 18 AAC 75.345(c) gives ADEC the unchecked power to define one person or a small group of persons as a "sensitive subpopulation" and then derive cleanup levels that are lower than the ones that have undergone extensive public notice and comment. ADEC should not be able to carry out such public policy at its sole discretion without following generally recognized risk assessment guidance and without public oversight.	reason for applying the provision as described in the commenters example. Unfortunately however, there are cases where there is no supporting data study and only default values are available. Since research is routinely being conducted, there may be cases where new peer reviewed literature based on clinical data support suggest the default value is not protective of the subpopulation. In these cases, ADEC may need to apply the provision. ADEC would consult with consult with experts in the field from EPA and ATSDR in these cases. In regard to the comment related to the process for groundwater and child exposure, please see response to comment #23.	
25.	Concerning ADEC's response to comment # 15: The response is inadequate. As noted in previous comment documents, ADEC should define the criteria by which a toxicity dataset for a chemical will be designed as "insufficient."	Any criteria established would vary widely by site, by contaminant, by available toxicity dataset, and changes that occur over time in how data is gathered and analyzed. Setting specific criteria is not a feasible approach and may lead to decisions that are not protective of human health or the environment.	N
Cleanup Levels – General			
26.	The EPA issued a new Health Advisory for PFOA & PFOS dated May, 2016 that result in different drinking water advisory concentrations. ADEC should reference the most recent federal advisories for these emergent contaminants (In Footnote 8) when developing soil cleanup levels.	Subsequent to the release of the updated proposed amendments, final updated toxicity studies on these contaminants became available. The Department concurs with the commenter and will update the cleanup levels for soil and groundwater and the corresponding Notes to Tables B1 and C to reflect the latest information.	Y
27.	New EPA data comes out on a frequent basis and someone may want to check all of the Table B1 & B2 footnote references to make sure they are citing the most recent science regarding these compounds/chemicals. It seems like a good time to address it since the regs are already in public review.	The department concurs with the commenter. Compounds in Tables B1 and C were reviewed for any changes in underlying science and the values recalculated where necessary to cite the most recent science.	Y
28.	Note # 8 for Tables B1 & B2 in 18 AAC 75.341 and Note #3 for Table C in 18 AAC 75.345 indicate that toxicity values from EPA's 2009 provisional health advisory (PHAs) levels for PFOA and PFOS were used to calculate the PFOS and PFOA cleanup levels. EPA released new lifetime health advisory (HAs) levels for these chemicals in 2016, based on new toxicity information. Please revise the cleanup levels for these chemicals, taking the most current information into account.	The department concurs with the commenter. Compounds in Tables B1 and C were reviewed for any changes in underlying science and the values recalculated where necessary to cite the most recent science.	Y
29.	It remains unclear as to what the cleanup levels for PFCs will be.	Cleanup levels for PFOS and PFOA will be revised based on public comment received to incorporate the latest toxicity information published in EPA's 2016 Health Effects Documents for these two compounds.	Y

30.	The regulations need to acknowledge that the Csat and solubility values are not risk based values (and that the use of the Csat and solubility value in the table documents that the soils cannot cause an unacceptable outdoor air inhalation risk and a dissolved phase plume will not cause an unacceptable groundwater ingestion risk. In addition, the regulations need to acknowledge that it is often not practicable to cleanup to the Csat level.	Footnotes to the cleanup levels (Tables B1, B2, and C) indicate those compounds that are capped at saturation limits or solubility. There is otherwise no requirement in either statute or 18 AAC 75 that requires that all cleanup levels be risk based. The presence of free product in soil may result in migration of the product to other media (air or water) or direct contact with the free product itself, thus it is important to address any free phase product where practicable. ADEC regulates groundwater concentrations on the total phase, not just the dissolved phase as the assessment to the receptor is based on the total phase. The practicability of free product recovery is already addressed in 18 AAC 75.325(f).	N
31.	In Table B-1 the proposed Soil Cleanup Levels based on migration to groundwater are 0.0011 mg/kg for PFOA and 0.00043 mg/kg for PFOS which are 500 and 300 times lower than the previous proposed cleanup standards. These values are in error because erroneous soil organic carbon-water partitioning coefficient (Koc) values have been applied in their derivation. The previous Koc values in the 2015 proposal were 26,250 cm^3/g and 71,680 cm^3/g, respectively. The currently used values are 2.06 cm^3/g and 2.57 cm^3/g, respectively, based on Higgins and Luthy (Higgins, C. and R. Luthy. 2006. Sorption of Perfluorinated Surfactants on Sediments. Environ Sci Technol. 40(23):7251-7256). These two Koc values are incorrect. Higgins and Luthy (2006) cite the log Koc values are 2.06 cm^3/g and 2.57 cm^3/g, which means that the Koc values are actually 115 cm^3/g and 372 cm^3/g. Although Arcadis does not necessarily endorse these Koc values, the cleanup values should re-calculated given that the currently proposed values are incorrect.	The Department appreciates the comment and identification of this error. The soil cleanup levels for these two compounds have been recalculated with correct Koc values obtained from Table 1-1 and 2-1 of the final EPA health assessment document which was listed as a Koc and not log Koc. ADEC obtained the original reference and agrees with the commenter the values are actually a log value. The calculation has been corrected as follows: : PFOS Koc = 2.57 updated = 371.5 PFOA Koc = 2.06 updated = 114.8	Y
Cleanup Levels – MCLs			
32.	The elimination of EPA Maximum Contaminant Levels as cleanup goals, as implemented by Table C in Section 18 AAC 75.345(b) causes a vast discrepancy between different regulatory programs that establish "safe" levels. Since Alaska relies on the EPA MCLs for drinking water protection, the state is essentially sending mixed messages regarding "safe" levels in groundwater and in drinking water. In order to maintain a consistent regulatory program regarding "safe" levels in drinking water/groundwater, it is	To provide consistency to the regulated community, the department is setting regulatory limits using the same set of equations and default factors for all the chemicals, for both soil and groundwater. Deferring to MCLs for some compounds results in inconsistent standards for groundwater. The inconsistency is compounded for the migration to groundwater criteria which are back-calculated from the groundwater cleanup standards. The Table C criteria for some compounds, while different from MCLs, apply to untreated source water that has been polluted. MCLs only apply post treatment at the tap for a regulated	N

	recommended that when available, the MCL remain as the groundwater level on Table C. DoD Comment on ADEC response (41): Partially addressed, unclear response. ADEC response appears to be a response to a combination of comments, or a revision to our comment, which did not address the comment which is that there is a disparity between drinking water standards and cleanup standards.	public water system. An institutional control can be established for a site where groundwater does not meet the MCL, but the MCL is met at the tap following treatment. The regulations also allow the department to consider a more-stringent MCL or an MCLG, or a Health Advisory level, on a site-specific basis. These options are how the disparity can be addressed, should it arise.	
Cleanup Levels - Groundwater			
33.	Table C within 18 AAC 75.345 lists several chemicals with cleanup levels higher than the maximum contaminant level (MCL) set by EPA for drinking water quality. PFOA and PFOS are also listed at concentrations above the former PHAs and the current HAs. While 18 AAC 75.345(c) allows the department to set a more stringent cleanup level based on the MCLs and HAs, I am concerned that this ability will be inconsistently applied by the department. All residents of Alaska should receive the same level of protection from the department's oversight. Please default to the most protective concentration in Table C, whether department-calculated, the MCL, or an HA. It is inappropriate for a private well owner to be told that their water doesn't need to be as clean as someone who is drinking from a public water system.	The cleanup levels for PFOA and PFOS will be updated to incorporate the toxicity information in the 2016 Health Effects Documents published by EPA, and the Department's cleanup level equations. Health advisory levels include additional exposures to contaminants through diet, use of household products and occupational exposures. These other exposures are outside the scope of the Site Cleanup Rules (18 AAC 75.325-390). The regulations allow the department to consider a more-stringent MCL or an MCLG, or a Health Advisory level, on a site-specific basis. These options are how the disparity, should it arise, can be addressed.	Y
Cleanup Levels - Metals			
34.	The proposed arsenic CLs for soil and water caused the greatest public concern. Comparing EPA and CSP derived CLs illustrates the importance of risk management. EPA identifies maximum contaminant level goals (MCLGs), while CSP simply multiplies those goals by ten to set CLs for soil and water. Risk management reveals that the arsenic pathway from soil to groundwater is being mostly driven by water chemistry. Remediating soil by known methods would be both infeasible (too expensive) and cause greater health/environmental risks (mayhem). Consequently, EPA does not require cleanup of either the source (except RCRA wastes) soil or groundwater. Remediating the drinking water was the most feasible alternative, with the national MCL determined by conservatively balancing the cost of treatment with potential health improvement. EPA's resulting 10 µg/L MCL for arsenic is 200 times their MCLG.	The Department has added a footnote into the table that clarifies that arsenic concentrations at a site will be determined to be natural background unless anthropogenic contribution, through an activity, or mobilization via another introduced contaminant has been identified or suspected. The 2009 memorandum *Arsenic in Soil* will be updated and clarified to reinforce this point and more clearly define the evaluation process required by responsible parties.	N
35.	Several new cleanup levels (soil and groundwater) are likely to be determined to be below background levels. EPA CERCLA guidance does not require cleanup below background levels. Any cleanup up levels that are potentially below background levels will	The Department will invite review and comment of the revised guidance on evaluating background concentrations from interested parties.	Y

	require case by case discussion on the applicable background level to ensure that cleanup is not below that level. This may require a background analysis that would cause significant delay and substantial additional cost. DoD comment on ADEC response (#17, and #36) This comment was partially addressed. While responses #17 and #36 indirectly address cleanup levels at or below background, #17 refers to guidance not yet developed. ADEC should provide and allow review of guidance as soon as possible and prior to regulations implementation.		
Procedures for Calculating Cleanup Levels			
36.	I noticed an apparent error in the Table 3 in Section 7: Calculating Cleanup Levels under Method Three. The table is specific to developing an alternative residential soil cleanup level under method three. The Table 3 lists Site-specific parameters that may be modified for Table B1 compounds. However, there are several parameters listed in the table that should not be modified. Several of the parameters are not site specific soil data that can be changed in accordance with the regulations at 18 AAC 75.340(e) for an alternate cleanup level for a residential scenario. Please consider revising for consistency with 18 AAC 75.340(e).	The commenter is correct; this is an error. The Table will be corrected in the final adopted version.	Y
37.	18 AAC 75.340 adopts the Procedures for Calculating Cleanup Levels by reference. The Procedures should be revised prior to adoption because Table 3 within the document gives the impression, by listing both a child and adult default value for the parameters AF, BW, ED, IRS, SA and IRW, that the user can choose to use the adult value instead of the child value. This is incorrect for groundwater calculations.	The commenter is correct; this is an error. The Table will be corrected in the final adopted version.	Y
38.	The source of toxicity values for each hazardous substance in the Tables of Section 18 AAC 75.341(c) should be clearly identified. Note that the document "Procedures for Calculating Cleanup Levels" dated July 15, 2015, also suffers from this lack of transparency for the source of the toxicity values used to derive these proposed "cleanup levels". Tier 3 toxicity values may have varying levels of peer review and are subject to more uncertainty than toxicity values from Tier 1 and Tier 2 sources. DoD comment on ADEC response (#30, 79, 83): Partially addressed. DoD thanks ADEC for partially incorporating our comment, however we feel the response does not address the questions on toxicity value	Please note the references for chemical toxicity values have been listed in Appendix A of the Procedures for Calculating Cleanup Levels. Listing all the references in the soil cleanup level tables in 18 AAC 75.341(c) is too cumbersome, thus only special cases were footnoted. ADEC understands that tier 3 sources have a level of uncertainty. The department consults with the Superfund Technical Support Center as noted in the Risk Assessment Procedures Manual in circumstances where the level of uncertainty is high.	N

	source, CERCLA hierarchy of toxicity factors, and valid science and procedures that validates toxicity factors.	With the CERCLA process a risk assessment is performed and those uncertainties are documented for site related decisions. The uncertainty with tier 3 values spans both ends of the spectrum. They can be too conservative (protective) or not stringent enough (not protective). The consequence of not providing a value in regulation is that a responsible party (RP) would need to provide an alternative source of water if an unlisted compound is detected until sufficient toxicity information is available to determine a protective value. Thallium would fall in this category. The RfD ADEC has proposed of 1.0E-5 mg/kg/day is based on a NOAEL and uncertainty factors from a 90-day rat study. California developed the same RfD using the same study. Minnesota, Michigan, Massachusetts and New Jersey have also adopted the PPRTV (2012) screening chronic p-RfD of 1.0E-5 mg/kg/day. ADEC's current RfD for thallium is 8.00E-05 mg/kg/day from a 1994 EPA document on thallium sulfate," EPA Coversheet Integrated Risk Information System (IRIS) Office of Health and Environmental Assessment, U.S. Environmental Protection Agency, Cincinnati, OH," and is outdated. Given the options (not providing, updating or not updating) ADEC has proposed updating the RfD to 1.0E-5 mg/kg/day.	
39.	Previous changes to the Risk Assessment Procedures Manual (cumulative risk for the hydrocarbon fractions) may become significant due to changes proposed for the Procedures for Calculating Cleanup Levels document (use of the Andelman volatilization factor)	The petroleum fractions are not being updated in the proposed amendments, thus the exposure pathway associated with showering of volatiles using the Andelman volatilization factor isn't included in methods 1-3 of the regulation for the petroleum fractions. A method 4 risk assessment would need to capture the complete exposure pathways associated with the contamination. If domestic use of groundwater for showering is occurring, the inhalation pathways for volatiles would need to be assessed. Whether the Andelman volatilization factor is used is up to the RP, as there is no specific requirement in the Risk Assessment Procedures Manual. However, to ADEC's knowledge, no other method has been proposed for assessing this pathway. The comparison and uncertainty associated with petroleum fractions compared to the indicator compounds is required as noted in the risk assessment.	N

		The current process for determining the cumulative risk from petroleum fractions in a method 4 risk assessment requires the additive risk from the fractions so as not to dismiss a portion of the risk. ADEC takes a middle-of-the-road approach, by calculating the risk individually for each of GRO, DRO, and RRO to produce three hazard indices. Other approaches like EPA's 2009 PPRTV sums all the petroleum fractions to generate a single hazard index which is the most conservative approach for calculating risk. The current method 2 cleanup levels dismisses a portion of the risk associated with GRO, DRO and RRO, which is the least conservative approach. Presentation of other approaches for determining cumulative risk for petroleum fractions can be presented and discussed in the uncertainty section of the risk assessment.	
40.	Because soil inhalation and migration to groundwater calculations for organic compounds are not correct when NAPL is present, I don't think that the soil direct contact and outdoor air inhalation cleanup levels should be combined into a single "health" based soil cleanup level. The single health based cleanup levels combine soil direct contact cleanup levels, which are valid, with outdoor air inhalation cleanup levels that are not valid at most sites, yielding a combined health based cleanup level that is not valid at most sites. Also, the document needs to acknowledge that cleanup levels that are set to the Csat values and solubility limits are not risk based cleanup levels. This comment is similar to my comment during the first public comment period and the ADEC response to my earlier comment did not really address the issue. The issue is about clearly communicating the science, understanding the limits of the calculations and getting a representative answer, so that we can make good site management decisions.	The cleanup levels in Table B1 are designed to be generic and conservative. Responsible parties have the option to collect site-specific data and calculate and propose site-specific cleanup levels using an approved fate and transport model that accounts for the risk posed when non-aqueous phase liquid (free product) is present. The calculations used to develop DEC's cleanup levels does indeed begin with a risk-based approach; however, where risk based values exceed solubility or saturation limits, the levels are capped at those limits.	N
41.	The Procedures for Calculating Cleanup Levels document needs to acknowledge that the migration to groundwater calculations are not correct when the contaminant is in the saturated or seasonally saturated zone. This comment is similar to my comment during the first public comment period and the ADEC response to my earlier comment did not really address the issue. The issue is about clearly communicating the science, understanding the limits of the calculations and getting a representative answer, so that we can make good site management decisions.	If contamination is in contact with the saturated or seasonally saturated zone, then groundwater monitoring is required. Models in general, including the soil water partitioning equations, have uncertainties. In cases where the default cleanup levels under method two are not protective, the department has the option to require a site-specific cleanup level that is more stringent.	N

42.	The revised regulations should not lock in the use of the Andelman volatilization factor, because the Andelman volatilization factor is overly conservative. Rather, the regulations need to 1) explicitly allow for alternative Method Three calculations of risk associated with the volatilization from tap water exposure route; or 2) use a more representative calculation for the volatilization from tap water exposure route as the default. My original comment pointed out that "The Andelman volatilization factor appears to be overly conservative in that it has been documented to yield results above maximum theoretical vapor concentrations". The ADEC response to this portion of my comment was "*The Andelman approach is adequate for volatiles, but it will tend to overestimate exposure if semivolatile constituents are included. This is not the case for the proposed regulation as the Andelman is only applied to volatile organic compounds*…." During the second public comment period I asked if the ADEC had calculated a volatilization from tap water cleanup level using any equations (e.g. Foster & Chrostowski, Little, McKay or Schaum) other than the equation using the Andelman volatilization factor. The ADEC responded using a Frequently Asked Questions format as follows "*ADEC did not calculate values for comparison as mentioned above. However, ADEC did evaluate literature that compared different model concentrations. Please remember that for the pathway to be calculated the chemical must be determined to be a volatile compound and have an inhalation toxicity value (Inhalation unit risk and/or reference concentration) associated with the chemical. Chemicals with a vapor pressure greater than 1 mm Hg or a Henry's Law constant greater than 0.00001 atm-m3/mole are considered volatile in the proposed updates. Comparisons with the Andelman model have been evaluated with the McKone and Little models as presented in the table below and show generally similar results for volatile compounds.*" The ADEC did not provide a reference for the data in the above table, but I am familiar with the paper that the data was excerpted from (Table C.2 in *Inhalation Exposure to Tap Water Through Showering Literature and Model Review* published as Appendix C to a report titled Volatilization Rates from Water to Indoor Air Phase 2, EPA, 2000). The data presented in the EPA paper leads me to a different conclusion than the ADEC has drawn in their response to my question. I have reproduced the pertinent portion of EPA Table C.2 below (i.e. the five compounds that would be classified as	As noted in the cited reference, "the experimental overall mass transfer rate coefficient data presented in the reference does not provide conclusive evidence as to which model best simulates semivolatile compounds (i.e., the Little model provided excellent prediction of Kol for 1,2,3-trichloropropane, but it significantly underestimated the Kol for 1,2- dibromo-3-chloropropane)." The Andelman model can be used to calculate the shower air exposure concentrations directly. The other models requires additional information that is more extensive and site specific. This level of site-specific detail makes these models inappropriate for setting statewide, generic cleanup levels for groundwater. Furthermore, Method Three is only for setting site-specific alternative cleanup criteria for soil, not groundwater. Therefore method three cannot be used to modify Table C groundwater cleanup criteria. A review of other states' cleanup values suggests the Andelman model is routinely used in the groundwater inhalation pathway for residential groundwater use scenarios (i.e. Kansas, Nebraska, Ohio, Oregon, and New Mexico). Preliminary clean up goals are meant to be conservative and need to capture uncertainty associated with exposure (i.e. these models only considered vaporization of the chemical and do not take into account the ingestion of droplets during showering or hot water vapors associated with showering). As stated before in the department's original response, the Andelman factor is routinely used in risk assessment and cited in EPA Risk Assessment Guidance for Superfund: Volume I - Human Health Evaluation Manual Part B, Development of Risk-based Preliminary Remediation for assessing the risk of volatiles from household water use. Several risk assessment performed in Alaska from Department of Defense sites have proposed the assessment of the pathway for volatile vapor from groundwater using the Andelman Factor in their work plan. Two recent ones are Galena Airforce Base and Fort Wainwright (which has EPA oversight and the work performed by the Army Corps of Engineers.). ADEC is not aware of other models routinely used for assessing this pathway, however an RP could propose one for a review in a method 4 risk assessment. References:	N

	volatiles by the ADEC), and added the Henry's Constant values and a calculation of the potential overestimate of the Andelman approach compared to the Little approach. The Andelman (screening) approach calculates concentrations that are about an order of magnitude higher than the more detailed Little approach for compounds with relatively lower Henry's Constants, but that are still volatile according to the ADEC definition. The EPA report shows that the Andelman approach calculates vapor concentrations that are above saturation concentrations for compounds with relatively lower Henry's Constants, but that are still volatile according to the ADEC definition. These results are not possible, and lead the EPA to make the following statement "*The results presented in Table C.3 illustrate the inadequacy of the Andelman (1990) exposure concentration equations for anything but highly volatile compounds*". My original comment on the Andelman approach included the statement "The EPA regions that I talked to, use the Andelman volatilization factor for screening but not for risk calculations". I should have said the EPA regions that I talked to, use the Andelman volatilization factor for screening, but do not require it's use for risk calculations. Rather the EPA recognizes the Andelman volatilization factor as a screening level calculation and accepts other more detailed equations for risk calculations. The revised regulations should not lock in the use of the Andelman volatilization factor, because the Andelman volatilization factor is overly conservative. Rather, the regulations need to 1) explicitly allow for alternative Method Three calculations of risk associated with the volatilization from tap water exposure route; or 2) use a more representative calculation for the volatilization from tap water exposure route as the default.	EPA Risk Assessment Guidance for Superfund Volume 1 Human Health Evaluation Manual (Part B) 1991.	
43.	ADEC stated that it would add a single footnote in Appendix A to reference the Regional Screening Levels and include a date on which the information was obtained. No such footnote has been provided to Appendix A. ADEC's response is inadequate, because not all input parameters listed in Appendix A, Table 6 (including toxicity factors) were derived from United States Environmental Protection Agency's	The sources of the chemical specific parameters are listed in the introduction section of the Procedures for Calculating Cleanup levels. We will add a footnote citation referencing the section of the document where they can be found. ADEC has provided all the toxicity references in Table 6 of appendix A of the Procedures for Calculating Cleanup Levels.	Y

	(USEPA) Regional Screening Levels. Given that certain toxicity factors, such as those for PFOS and PFOA are not listed on the current Regional Screening Level table, ADEC must ensure that specific support for all 17 parameters listed in Appendix A, Tables 6 and 7 is provided. ADEC has provided citations for toxicity factors in Table 6 but there are still no citations for physicochemical parameters In Table 7. In the Comment Responsiveness Summary (May 17, 2016), (Response #79), ADEC states: "The individual parameters will not be cited, but the hierarchy of sources for chemical specific parameters has been added. All questions about sources for a specific parameter or value, or related information, can be addressed to and will be answered by CS program staff." ADEC's response to the comment is inadequate, because It falls to provide the necessary transparency to the public as to the technical bases for ADEC's regulatory actions and depends entirely on the responsiveness of the ADEC staff. Accordingly, Arcadis comments again that Table 7 of Procedures for Calculating Cleanup Levels be revised to include source citations.		
44.	Discrepancies in Risk Assessment Input Parameters -- ADEC has corrected many discrepancies between certain default parameters that it had proposed to be used to estimate the rate of volatilization of compounds from soil in Section 6.4 and parameters presented in Appendix B, Table 8 of the Procedures for Calculating Cleanup Levels, the latter of which ADEC proposes to adopt as a regulation. The default parameters included exposure interval (T), total soil porosity (n), water filled soil porosity (9w), air filled soil porosity (9a), and organic carbon content of soil (Foe). However, the input parameters (A, B, and C constants) for the calculation of the Q/C factor (i.e., inverse of the mean concentration at the center of a 0.5-acre source) are still not included in Section 6. The regulations themselves must unambiguously define the required parameters. Thus, ADEC must include the A, 8, and C dispersion constants in the equation box in Section 6.4 so that the public has sufficient opportunity to review and comment on them.	Section 6.4 derivation of the volatilization factor has to deal with the, "Petroleum Fraction Equations." ADEC is not proposing any regulation changes to the petroleum fractions at this time.	N
45.	Arcadis compared the dispersion constants presented in Procedures for Calculating Cleanup Levels, Appendix B, Table 7 against the Information presented in Exhibit D-2 in USEPA (2002). USEPA's Exhibit D-2 contains constants established at each of 29 meteorological station sites used in USEPA's dispersion model analysis. Based on this comparison, it appears that ADEC selected the dispersion constants for Casper, Wyoming (Zone 4) to	The dispersion coefficients used are those listed in the Soil Screening Guidance. The cities of Seattle, WA (representative of >40 inch zone), Minneapolis, MN (representative of <40 inch zone) and Casper, WY (representative of the arctic zone) are used because these sites have monitoring stations and are similar in climate to the respective zones in Alaska. The calculator was incorrectly using a dispersion constant for	Y

	represent Arctic Zone soil; dispersion constants for Minneapolis, Minnesota (Zone 5) to represent Under 40" Zone soil; and dispersion constants for San Francisco, California (Zone 2) to represent Over 40" Zone soil. ADEC fails to identify the rationale for selecting dispersion constants associated with these three disparate locations as representative of climate conditions in Alaska. ADEC must revise its Procedures for Calculating Cleanup Levels to explain the rationale for the use of these dispersion coefficients and to afford the commenting parties a more meaningful opportunity to comment on this aspect of the guidance. ADEC's response is inadequate for two reasons: 1) It does not provide ADEC's regulatory, scientific or technical rationale for using coefficients from Wyoming, Minnesota, and California to represent climatic conditions in Alaska; and 2) while ADEC cites to Harding and Lawson, there is no specific citation to enable a member of the public to obtain and evaluate the cited document. Thus, Arcadis requests again that ADEC provide a regulatory, scientific or technical rationale for choosing these parameter values and Instead of stating that Harding Lawson consultants made the parameter choices, ADEC should provide the actual document so the interested parties could read the Harding Lawson rationale.	San Francisco to represent the >40" zone; this has been corrected. We appreciate the commenter's reporting of this error. The department will make the Harding Lawson Associates report available on the CS program guidance website.	
	Procedures for Calculating Cumulative Risk		
46.	The cumulative risk document appears to require the use of the RBCs presented in Appendix B, however, the inhalation RBCs presented in Appendix B for the organic compounds are not correct for most sites, because the inhalation RBCs for soils do not account for 4-phase partitioning with Raoult's Law. I made this comment previously and the ADEC response was "*The 4-phase partitioning with Raoult's Law is not being proposed in setting the default method two cleanup values in Table B1. A 4-phase approach may be proposed on a site specific basis under Methods 3 or 4.*" I understand that 4-phase partitioning with Raoult's Law is not being proposed or directly acknowledged in the Cumulative Risk document and that is problem. The Cumulative Risk document provides instructions essentially saying "do this" and "use this form" without mentioning or acknowledging that 1) the inhalation RBCs are not representative (invalid) when NAPL is present, 2) that NAPL is present at essentially all regulated hydrocarbon sites, and that 3) 4-phase partitioning with Raoult's Law does provide more representative	The Department's original response remains valid. The Department understands that the commenter has a different opinion about how to calculate cleanup levels and cumulative risk for the inhalation pathway; but the department uses a conservative approach that is based on well-researched and widely accepted science. Setting generic cleanup levels statewide with generic assumptions and inputs and using Raoult's Law is not appropriate and will result in cleanup levels that are not protective. Furthermore, the Department does not establish cleanup levels solely based on risk but also on whether remaining contamination has caused soil, groundwater, or surface water to be unclean, impure or unfit for use. A 4-phase approach may be proposed on a site-specific basis under Methods 3 or 4.	

	information. Information to this effect needs to be added to the Cumulative Risk document.		
47.	Groundwater Exposure Point Concentrations -- In Section 2.2.3, ADEC states that a cumulative risk assessment should be performed using the single maximum groundwater concentration of a constituent. United States Environmental Protection Agency (USEPA) guidance, however, provides that a conservative estimate (95th upper confidence limit ("UCL")) of average concentrations of constituents in groundwater representing current conditions should be used to represent groundwater exposure point concentrations (EPCs). ADEC has made no changes to Procedures for Calculating Cumulative Risk (May 15, 2016) with regard to this issue throughout the proposal period. Commenter again recommends that ADEC provide the public health basis(es) for departing from USEPA policy, which focuses risk assessment activities on high end rather than maximum exposures. Merely stating that ADEC has a more stringent requirement than USEPA is not an adequate response to this comment.	18 AAC 75.380(c)(2) requires the maximum groundwater concentration be used for compliance, thus it is consistent with regulation. ADEC is aware of the EPA guidance but has a more stringent requirement cited in regulations that are not currently proposed for changes as part of this regulations package. While ProUCL is an accepted program for use in calculating upper mean, approval is still required as noted in the regulation. In some cases, the maximum concentration is still used due to distribution or an insufficient data set.	N
48.	Soil Exposure Point Concentrations -- According to Section 2.2.3, for soil, the maximum value must be used unless ADEC approves an appropriate statistical method for estimating the 95% UCL of the site after cleanup. This approach for a cumulative risk assessment is at odds with the newly proposed Risk Assessment Procedures Manual (RAPM) (February 16, 2015). The proposed RAPM specifically states that the 95% UCL should be used as the soil exposure point concentration for risk assessments in Alaska, and not the maximum concentration. In Comment Responsiveness Summary (May 17, 2016), (Response #96), ADEC states: "18 AAC 75.380(c)(2) requires the maximum groundwater concentration be used for compliance. ADEC is aware of the EPA guidance but has more stringent requirement in the cited regulation. While ProUCL is an accepted program for use in calculating upper mean, approval is still required as noted in the regulation. In some cases the maximum concentration is still used due to distribution or an insufficient data set."	The language is consistent with 18 AAC 75.380(c) which states: (1) applicable soil cleanup levels, based on sampling results from onsite contaminated soil and from contaminated soil moved offsite for treatment or disposal, and based on the maximum concentrations detected, unless the department approves an appropriate statistical method, in which case compliance will be based on the mean soil concentration at the 95th percent upper confidence limit; approval of a statistical method will be based on (A) the number and location of samples taken; (B) whether large variations in hazardous substance concentrations relative to the mean concentration exist; and (C) whether a large percentage of concentrations are below the method detection limit; A method 4 risk assessment is site-specific and typically applies to complex sites. In these cases larger sample sets are taken for the site characterization and are typically adequate for developing a 95%UCL. However, the maximum concentration could still be applied in a risk	N

	Thus, ADEC re-states that it must approve the use of the 95% UCL of soil concentrations using ProUCL despite the fact the "ProUCL is an accepted program" for calculating 95% UCLs. ADEC offers no regulatory, scientific, or technical explanation for its apparent change in position, which it is required to do. Accordingly, Arcadis again recommends that ADEC pre-approve the 95% UCL of the mean using ProUCL as an "appropriate statistical method."	assessment if too few samples are collected for the calculation or a statistically invalid result was generated. In these cases more field samples would be required or the maximum concentration would be used for the EPC. It is preferred in a risk assessment to collect enough samples for a 95UCL to calculate the risk as opposed to just using the maximum soil concentration. Typically for smaller sites there too few samples to calculate a 95% UCL and it is likely not feasible. However, RPs still have the option with approval. See response to Comment 47 regarding the use of ProUCL.	
Issues not Related to this Package			
49.	Revisions to the Risk Assessment Procedures Manual substantially change the calculation of hydrocarbon (DRO, GRO and RRO fractions) risk, and therefore have the potential to change cleanup levels and site closure at many DoD Sites. This will result in significant operational and cost impacts which have not been fully evaluated, and per Alaska statute, cost impacts should be evaluated prior to adoption of all proposed regulations. DoD comment on ADEC response (#67): Partially addressed, DoD thanks ADEC for partially incorporating our comment, however we feel that response #67 appears to address only a portion of this comment by noting that while these comments are not relevant to this regulation package, they have been noted and considered for future packages. The Risk Assessment Procedures Manual and this proposed regulation directly affect each other but remain inconsistent, and will affect processes and desired results. DoD requests reevaluation of the comment in order to implement consistent guidance.	The petroleum fractions are not being updated in the proposed regulation, thus the current process would apply in method 2 and 3 for petroleum. However, in a method 4 risk assessment, the additive risk from the fraction must be included so as not to exclude a portion of the risk. ADEC takes a middle of the road approach, by calculating and presenting the hazard indices separately for GRO, DRO and RRO. Other approaches like EPA's 2009 PPRTV for the petroleum fractions recommends summing all the petroleum fractions to generate a total TPH hazard index (HI). This is the most conservative approach. The current method 2 cleanup levels excludes a portion of the risk from GRO, DRO and RRO, which is the least conservative approach. Presentation of other approaches for determining cumulative risk for petroleum fractions can be presented and discussed in the uncertainty section of the risk assessment.	N

Regulation Timeline: Contaminants Regulated Under the Safe Drinking Water Act

Federal Register Publication Month/Year	Final Regulation	Number of Contaminants (Cumulative)	Action	Contaminants Regulated	
12/75; 7/76	NPDWRs	22 (22)	New regs	2,4-D 2,4,5-TP (Silvex) arsenic barium cadmium chromium coliform bacteria endrin fluoride gross alpha gross beta lead	lindane mercury methoxychlor nitrate radium-226[1] radium-228[1] selenium silver toxaphene turbidity[8]
11/79	Total Trihalomethanes Rule	1 (23)	New reg	total trihalomethanes (TTHMs[2])	
4/86	Fluoride Rule	1 (23)	*Revision*	*fluoride**	
7/87	Phase I (Volatile Organic Compounds)	8 (31)	New regs	benzene carbon tetrachloride 1,2-dichloroethane p-dichlorobenzene 1,1-dichloroethylene	1,1,1-trichloroethane trichloroethylene vinyl chloride[3]
6/89	Total Coliform Rule	1 (31)	*Revision*	*total coliforms*[2]	
6/89	Surface Water Treatment Rule	5 (35)	1 *Revision* 4 New regs	Giardia[4] *turbidity*[8] HPC bacteria[4]	Legionella[4] viruses[4]
1/91; 7/91	Phase II	38 and 1 deletion (61)	11 *Revisions* 27 New regs ~~1 Deletion~~	*2,4-D* *2,4,5-TP* acrylamide[4] alachlor aldicarb[5] aldicarb sulfone[5] aldicarb sulfoxide[5] asbestos atrazine *barium* *cadmium* carbofuran chlordane (mono) chlorobenzene *chromium* dibromochloropropane o-dichlorobenzene cis-1,2-dichloroethylene trans-1,2-dichloroethylene 1,2-dichloropropane epichlorohydrin[4]	ethylbenzene ethylene dibromide heptachlor heptachlor epoxide *lindane* *mercury (inorganic)* *methoxychlor* *nitrate* nitrite total nitrate/nitrite PCBs pentachlorophenol *selenium* ~~silver~~[9] styrene tetrachloroethylene toluene *toxaphene* xylenes
6/91	Lead and Copper	2 (62)	1 *Revision* 1 New reg	copper[4]	*lead*[4]
7/92	Phase V	23 (84)	1 *Revision* 22 New regs	adipate, di(2-ethylhexyl) antimony beryllium cyanide dalapon dichloromethane[6] dinoseb dioxin (2,3,7,8-TCDD) diquat endothall *endrin* glyphosate	hexachlorobenzene hexachlorocyclopentadiene nickel oxamyl (vydate) PAHs (benzo(a) pyrene) phthalate, di(2-ethylhexyl) picloram simazine thallium 1,2,4-trichlorobenzene 1,1,2-trichloroethane
n/a/95	N/A	1 (83)	*Remand*	*nickel*	

Federal Register Publication Month/Year	Final Regulation	Number of Contaminants (Cumulative)	Action	Contaminants Regulated	
12/98	Stage I Disinfectant and Disinfection Byproduct Rule	7 (89)	1 *Revision* 6 New regs	bromate chloramine chlorine chlorine dioxide	chlorite haloacetic acids (HAA5)[2] *TTHMs*[2]
12/98	Interim Enhanced Surface Water Treatment Rule	3 (90)	2 *Revisions* 1 New reg	Cryptosporidium[4] *Giardia*[4]	*turbidity*[8]
12/00	Radionuclides	5 (91)	4 *Revisions* 1 New reg	*gross alpha* *gross beta* *radium-226*[1]	*radium-228*[1] uranium
01/00	Revision to the Lead and Copper Rule	2 (91)	2 *Revisions*	*lead*[4]	*copper*[4]
1/01	Arsenic	1 (91)	*Revision*	*arsenic*	
6/01	Filter Backwash Recycling Rule	1 (91)	*Revision*	*Cryptosporidium*[4]	
1/02	Long Term 1 Enhanced Surface Water Treatment Rule	2 (91)	*Revision*	*Cryptosporidium*[4]	*turbidity*[4,8]
1/06	Long Term 2 Enhanced Surface Water Treatment Rule	1 (91)	*Revision*	*Cryptosporidium*[4]	
1/06	Stage 2 Disinfectant and Disinfection Byproduct Rule	2 (91)	2 *Revisions*	*HAA5*[2]	*TTHMs*[2]
11/06	Ground Water Rule	3 (94)	3 New regs	E. coli[7] Enterococci[7]	coliphage[7]
10/07	Lead and Copper Rule	2 (94)	2 *Revisions*	*lead*[4]	*copper*[4]
10/09	Airline Drinking Water Rule	1 (94)[10]	New	*total coliforms*[2]	
2/13	Revised Total Coliform Rule	1 (94)	2 *Revisions*	*total coliforms*[2]	*E. coli*[7]

*Italics in the Contaminants Regulated column indicates a rule that was revised.

Notes:

1. Radium-226 and radium-228 are counted as two contaminants although their standard is combined.
2. Total THMs, haloacetic acids, and total coliforms are counted as a single contaminant in the above table. However, each of these represent a group standard. The group standards consist of: TTHMs (chloroform, bromodichloromethane, dibromochloromethane, bromoform); TC (total coliform bacteria including fecal coliforms and *E. coli*); HAA5 (monochloroacetic acid, dichloroacetic acid, trichloroacetic acid, bromoacetic acid, and dibromoacetic acid).
3. Vinyl chloride is also known as chloroethylene & monochloroethylene.
4. These nine contaminants have a treatment technique instead of a MCL.
5. Aldicarb, aldicarb sulfone, and aldicarb sulfoxide are considered regulated contaminants although their MCLs are stayed.
6. Dichloromethane is also known as methylene chloride.
7. *E. coli*, *Enterococci*, and coliphage are indicators of microbial contamination.
8. Turbidity is a measure of cloudiness in water that indicates the presence of disease-causing microbes. Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites and some bacteria.
9. Silver was deleted during the Phase II regulatory action.
10. A new rule was developed applying specifically to airlines, but doesn't change the total count of contaminants regulated since total coliforms were already regulated by another rule for non-airline drinking water systems.

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